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EDITOR'S COMMENTS

THIS issue of *The American Neptune* begins with an article by the editor that examines the important role of "Byzantine and Moslem Shipping in the Mediterranean, 500-1250." This period is of special importance because in both technical and tactical ways it anticipated developments that took place in the oceans of the world in early modern times when rivalry between European maritime powers had such an important influence on global history. It is followed by an article by Jerry W. Cooney entitled "'Doing Business in the Smuggling Way,' Yankee Contraband in the Río de la Plata." This piece tells how American vessels during the period of the French Revolution and Napoleonic Wars found ways to change their registry and carry on a valuable trade with this area of Spanish Colonial America. It is perhaps a story of special interest now as we begin to flag oil tankers in the Persian Gulf during a period of war that affects the sea lanes.

A third contribution, by David Long called "'Mad Jack' Percival in Vietnam: First American Hostilities, May 1845," explains the circumstances behind our first naval hostilities in Vietnamese waters when Captain Percival tried to use force to free a French missionary. Incidentally, it is worth noting that his efforts were in the long run no more successful than our own intervention in these waters more than a hundred years later.

Then the mood changes with John O. Sands's long contribution, entitled "The U.S. Light-House Board: Progress through Process." This represents a survey of how during the nineteenth century American lighthouses were planned and administered by a special U.S. lighthouse board which was responsible for the excellent results which this service was able to achieve especially in the technical field. Without the work of the board it seems clear that navigation in American waters would have been much more dangerous than turned out to be the case.

Next we have Don L. Hofsommer's account of "The Maritime Enterprises of James J. Hill." This explains how this leading railroad entrepreneur attempted to improve his railway routes by setting up steamship lines on the Great Lakes and the Pacific during the decades just prior to World War I. Interestingly enough, these ventures were not very successful and by the 1920s had been abandoned. Apparently, knowledge of how to run railroads did not guarantee success in operating steamships.

Finally we have James Millinger's "Maritime Studies at Sea Semester." This tells of how an interesting sea education program has been run at Woods Hole in recent years, one that provides young men and women interested in the sea with a superb opportunity to learn *at sea* how to function on the dark waters of the turbulent ocean.

And to close, after our section on book reviews, we have an account of a new award program made possible through a generous bequest of the late Mr. Francis B. Lothrop, Jr., which will allow us to award two prizes per year to the authors of the best articles appearing in *The American Neptune*. We expect these awards to begin for articles appearing in the year 1988.

ARCHIBALD R. LEWIS

Salem, Massachusetts

Byzantine and Moslem Shipping in the Mediterranean, 500-1250

ARCHIBALD R. LEWIS

THE seven and a half centuries that stretch between the fall of the Roman Empire in the west and the mid-thirteenth century, when maritime control of the entire Mediterranean-Black Sea complex finally fell into the hands of Western Europeans, was a great age of naval and maritime progress and one that saw much of the development of the sailing ship as we know it in modern times. By this time the vessels that the ancient world—especially classical Greece and Rome—had developed for both commerce and warfare had disappeared from the Middle Sea. Their place had been taken by ships that differed profoundly from them in construction and sailing capacity, and they were used now in very different tactical and strategic ways. These early medieval ships opened up new possibilities of using seapower and maritime commerce on the oceans of the wider world. It is these changes and the reasons for them that we will be concerned with in this article.

Let us begin by examining the situation that existed by the end of the fifth century A.D. in the Mediterranean as far as both merchant ships and war vessels are concerned. By this time the western Roman Empire had disappeared and the shores of the Middle Sea beyond Greece were controlled by the barbarian Vandals in North Africa, the Visigoths in Spain, and the Ostrogoths in Italy and Sicily. Of these only the Vandals possessed any seapower. And theirs seems to have consisted of some pirate flotillas operating from ports in the area of modern Tunisia where their capital of Carthage was located. The eastern Mediterranean with its great cities of Alexandria, Antioch, and Constantinople still remained Roman and was both prosperous and peaceful. Especially important by this time was the new eastern Roman imperial capital of Constantinople which, since its founding by Constantinople a century and three-quarters earlier, had grown to a metropolis of half a million and was probably the largest city in the world at this time. The eastern Roman world maintained a strong army to protect its oriental frontiers from the Sassanian Persians and its Danubian frontier from barbarian tribes who threatened it from the north. It had no effective navy, however, and its one attempt in A.D. 472 to improvise one from merchant shipping and use it against the Vandals in the west had ended in disaster. War vessels and seapower as developed later on, then, hardly existed in the Mediterranean world of the late fifth century A.D.

As far as merchant vessels are concerned, though, certain changes had by now already taken place. In earlier centuries two types of merchant ships had been used to carry cargos by sea in this part of the world. Most were small two-masted sailing ships called *naves* which we find depicted in the frescoes of imperial and Ostrogothic Ravenna. Most were equipped with single square sails, but a few made use of triangular sails called *lateen* or latin sails. They used steering oars and were seldom larger than one hundred tons. The other basic type consisted of huge vessels built to carry tribute grain and olive oil from Egypt's Alexandria or North Africa to Rome where these foodstuffs were distributed to the proletarian population of the capital city. To expedite this traffic, first- and second-century Roman emperors had built huge artificial harbors and warehouses at Ostia, which was at the mouth of the Tiber. By A.D. 500, however, as new capitals like Constantinople, Ravenna, and Trier replaced Rome and barbarian tribes took over the Roman west this grain trade had largely disappeared and with it the large vessels that had been built to transport it. The smaller *navis* had become the merchant ship for excellence for the entire Mediterranean-Black Sea area.

During this same era methods of building ships had

also begun to change. Underwater archaeology of ancient ships has revealed to us that until this period all types of vessels were built using an outer shell technique with ribs only added later on. As Casson and others have emphasized this meant that the outer shell of a ship was built up piece by piece using a mortise and tenon system. This type of construction demanded extremely skilled shipwrights who could fit ship timber together almost as if they were building a cabinet. Perhaps this method had appeared because ship timber was relatively scarce and expensive in areas like Syria, Egypt, and North Africa where maritime commerce was most active. By A.D. 500, however, all this had begun to change. The main maritime and imperial centers were now located much farther north and were in the northern Adriatic near Ravenna and around Constantinople between the Black Sea and the Aegean. In both these areas, and especially at Constantinople, ship timber was abundant and relatively cheap. Perhaps it was for this reason that we now begin to find in these areas the very first beginnings of a frame-first construction of vessels, which demanded much less carpentry skill than the older way of building them. And along with this change we begin to find still another which was to affect shipping profoundly—the use of wooden barrels to replace the heavy pottery *amphorae* which heretofore had been used throughout the Mediterranean and Black Sea to transport liquid cargoes like wine and olive oil. The container revolution which was to transform both merchant ships and their freight had begun to take place, though this change was to be very gradual indeed.

By the first years of the sixth century, however, all the evidence we possess seems to show that merchant and other vessels were still small *naves,* as had been the case earlier, and only a few of them had as yet begun to use elements of a frame-first construction as a building technique. Then, rather suddenly, a new naval age dawned. This came about because the eastern Roman emperor, Justinian, suddenly decided to regain the Mediterranean west from the barbarian rulers who had taken it over from Rome. To reconquer this area, and especially to defeat the Vandals who had some organized naval flotillas, he decided to construct a new and powerful navy. We are informed by Procopius that to do so he built a large number of swift oared warships called *dromons* or runners, which were the ancestors of all later Mediterranean galleys. They carried both sails and oars and were roofed over amidship to protect the rowers during combat. The rest of the ships that transported eastern Roman armies west were merchant vessels pressed into service by the state to carry men, war materiel, and horses to battlefronts in North Africa and Italy.

Justinian's fleets never saw any serious combat until late in the Ostrogothic War when they tangled with a fleet which Totila, the last Ostrogothic king, built in northern Italy. But they played an important role in maintaining communications with Byzantine armies in the west which were commanded by Belisarius and Narses and in helping to seize southern Spain from its Visigothic rulers. Even more important, though, was the organization of a system of overseas bases and of imperial dockyards near Constantinople which represented the beginnings of an imperial Byzantine naval system that was to last for some seven centuries. And this system proved to be powerful and flexible enough to defend its western provinces from Berber and Lombard assaults and link them to the Eastern Empire for the next century or more. And in A.D. 610 contingents of this fleet stationed in Constantinople were also powerful enough to defend the capital against an Avar naval attack and a few years later to support by sea Heraclius' invasion of the Sassanian Empire from ports in the Caucasus.

In the middle of the seventh century, however, a new naval era dawned in the Middle Sea. This came about because of the sudden seizure of Syria and Egypt by Moslem armies. And then shortly thereafter the extension of their rule over the rest of North Africa and Spain inaugurated a bitter contest on the sea between that part of Romania that remained Byzantine near Constantinople and those shores that were now held by the Ommayad caliphs of Damascus. In this seesaw struggle both sides seem to have used the same kind of warships and merchant transports that Justinian had inaugurated a century earlier and Herclius had found so useful. And if we can believe evidence from the seventh-century Yassi Ada wreck discovered off the coast of Anatolia, merchant ships remained small *naves* with only slightly more reliance upon frame-first construction than had previously been the case. And at least down to the end of the seventh century, judging from the Rhodian Sea law which seems to date from this period, they were still handled by independent captains who carried varied cargoes throughout the Mediterranean-Black Sea area.

What did change in the employment of seapower,

however, was in the tactical use now made of warships and their handling in combat. The most spectacular of these changes was the development of Greek fire for use by the ships of the Byzantine imperial fleet based on Constantinople. This secret weapon, which may go back to the days of Heraclius, was now perfected and seems to have been shot as a combustible substance at enemy ships using syphonlike tubes. It helped Byzantium to defeat two great Arab fleets which attacked Constantinople in 672-678 and then again in 717-718. And ultimately it made possible a complete Byzantine control of the central and eastern Mediterranean by their flotillas. This same conflict also resulted in Byzantine's setting up a new and more advanced system of naval defenses. Under this system the main imperial fleet, which was supplied with Greek fire, was stationed in Constantinople and was supplemented by provincial flotillas located in naval districts facing their Moslem enemies in both the central and eastern Mediterranean—thus anticipating a naval defense system that was to be copied by many later exponents of seapower in these and other waters.

Unfortunately for the Byzantines their control of the central and eastern Mediterranean came to an end by the mid-ninth century, not because they lost technical maritime skills or lost their ability to build excellent ships for trade or warlike purposes, but because civil strife seriously weakened their provincial fleets based on Sicily and near the entrance to the Aegean. Perhaps the fact that their Moslem enemies learned how to use Greek fire also helped. As a result of this, Moslem flotillas mainly composed of pirate vessels advanced out into the Mediterranean and seized control of the Balearics, Sardinia, Sicily, Crete, and Cyprus. This did not destroy Byzantine seapower but effectively penned it up in the Adriatic and the northern Aegean-Black Sea area. Behind their advanced pirate-held island screen Moslem merchant shipping could now travel undisturbed from Syria and Egypt past Sicily and Tunisia all the way to Morocco and Andalusia, while back of these small bases the major Islamic powers of the Middle Sea, the Spanish Ommayads in the west, the Fatimids in the center, and the Ikhshids in the east, maintained effective standing navies of their own. An age of Moslem control of much of the Middle Sea had at last appeared after more than two centuries of rivalry with their Byzantine maritime opponents.

What kind of ships were used by the Moslems during the late ninth- and tenth-century period? It is difficult to say with any exactitude because we lack precise evidence of them. We have, however, little reason to believe that their warships differed much from those used by their Byzantine rivals and were much like the *dromons* or galleys which had been inaugurated by Justinian, and were used by Heraclius. Leo of Tripoli's seizure of Saloniki in 904, however, does show that by this time Moslem naval commanders had mastered amphibious warfare. And *Geniza* documentation from Cairo shows that while most merchant ships were small, some of them were also relatively large, especially those used along the Alexandria-Palermo-Andalusia sea lanes. And judging from the somewhat later *frescoes* at San Marco in Venice and manuscript illustrations from Byzantium, both Byzantine and northern Italian built ships were quite similar to those constructed in Islamic dockyards.

By the last half of the tenth century, however, we began to find evidence of some important changes in ship types—first as regards to warships. About mid-century a Byzantine admiral, Romanus Lecapenus, became emperor and began to rebuild the empire's fleet. In doing so he began to increase the size of his warships so they would have an advantage over their Moslem opponents. Such ships remained an integral part of the home fleet at Constantinople and as late as 1043 were easily able to destroy the smaller ships of a Russian fleet which was attacking the Byzantine capital itself. Other important innovations also seem to have been made in other warships about this time. We learn, for instance, that in the Byzantine invasion of Moslem-held Crete in 963 special landing craft were constructed so that heavily armed cavalry or *cataphracti* could land directly on beaches—much like LSTs of World War II—and that special ships called *hussiers* for transporting horses were also developed. A balanced fleet, almost modern in its armament and composition, had at last made its appearances in eastern Mediterranean waters. And interestingly enough we have evidence that the Fatimids, who were Byzantium's chief naval opponents during this same period, also built much larger warships. By the first years of the eleventh century the huge warship or medieval battleship had finally appeared in these waters, just as it had in the northern Viking world of Canute and Olaf Tryggvason.

Did the size of merchant ships increase during this same period? We have some reason to think so, especially as regards the Islamic world. For instance, not

only do *Geniza* documents mention large ships, but as late as the last decades of the twelfth century Moslems could build a huge round ship in Syrian ports which Richard the Lionhearted's fleet was able to destroy only with great difficulty. And we do know from the early eleventh-century Serçe Limon vessel found off Antatolia and examined by underwater archaeologists that by 1020 or 1030 frame-first construction had at last come of age and was used in building even medium-sized merchant vessels. What had begun in the fifth century was now complete some six centuries later.

Then came a period in the mid and late eleventh century when both the Moslem and Byzantine worlds entered a time of troubles. The Byzantine Empire saw the interior of Asia Minor lost to Seljuk Turks after a defeat at Manzikert in 1071, while Patzinaks attacked from the north and Norman adventurers seized Byzantium's southern Italian provinces in the west. In the Arab world nomadic Seljuk Turks and bedouin Berber and Arab tribesmen put pressures upon the Fatimid and Ommayad realms which they could not resist in the face of internal strife caused by disaffected slave and mercenary contingents. In the disorders that followed standing navies were all but impossible to maintain, as were advanced bases held by Moslems in the islands of the Mediterranean. This gave an opportunity to rising Italian cities like Genoa, Pisa, and Venice to take aggressive action in the central Mediterranean, recover Sardinia, Corsica, and Sicily from the Moslems and assist Western Crusaders in their conquest of Syria and Palestine during and just after the First Crusade. A new element from Latin Europe had at last entered the maritime picture in the Mediterranean, not only as piratical flotillas and naval forces facing Moslem and Byzantine flotillas but as active merchants linking Western Europe directly with oriental wares and Eastern ports. A new age had dawned for the Middle Sea and its maritime activities.

In the twelfth century which followed, Almoravids and Almohads in the Magreb and Spain rallied and rebuilt naves again. Saladin did the same in Egyptian and Syrian ports, as did Byzantium under its Comneni emperors down to the death of Manuel about 1180. But this proved to be only temporary. By the end of the first half of the thirteenth century Western Europeans were again everywhere on the offensive. A Venetian Crusader armada destroyed the effectiveness of Byzantium on the sea by seizing Constantinople in 1204 in the Fourth Crusade and establishing a Latin Empire. And a bit later on aggressive land and naval forces from Christian Spain, who had Genoese backing, captured most of Islamic *al-Andulus* and opened the Straits of Gibraltar to northern European shipping. They also began to dominate the shores of Moslem North Africa—a domination which was to last until Ottoman times.

And as this happened larger warships like the *trireme* galleys were built by Catalaus and Italians and were found everywhere, as well as large round ships modelled on those built in the Islamic world. And these same mariners also now mastered amphibious tactics pioneered by their Moslem and Byzantine opponents as their attacks on Syrian Moslem ports, Damietta in Egypt, and Constantinople clearly reveal. And as this happened these Latin westerners added to their skills and maritime techniques some new elements. From northern Europe they brought in the rudder to replace steering oars, while in Italian waters they perfected a boxed compass which probably first was to be found in the area of the North Sea. These innovations made steering of both warships and merchant vessels much more effective and improved the ability of ships to sail out of sight of land even in overcast weather. A Western European naval and maritime world had at last emerged in the Mediterranean and was beginning to reach out from it, mingle with Northern European ships and maritime skills and advance towards world domination in the years to come.

But none of this would have been possible without those years of Byzantine and Moslem maritime technical and tactical advances, which were sharpened as they were by constant rivalry. As we have noted these resulted in frame-first construction, use of barrels in place of *amphorae,* larger ships, and a skill in organizing fleets for war and for peaceful purposes, which were to become a model for Western Europeans in the years to come. Without them the later age of Western European colonization and domination of the Seven Seas would not have been possible.

Additional detailed accounts of the material covered in this article can be found in Archibald R. Lewis's Naval Power and Trade in the Mediterranean A.D. 500-1100

(Princeton, 1951), Archibald R. Lewis's and Timothy J. Runyan's European Naval and Maritime History, 300-1500 *(Bloomington, Indiana, 1985), pp. 1-85, Richard W. Unger's* The Ship in the Medieval Economy *(Montreal, 1986), pp. 1-163 and Helene Ahrweiler's* Byzance et la Mer *(Paris, 1966).*

Considerable material on ship types of a technical nature, in the form of illustrations, is to be found in the Lewis and Runyan and Unger volumes as well as maps, etc. The Lewis and Runyan volume also has a full bibliography on pages 171-79 which interested readers may find to be useful.

"Doing Business in the Smuggling Way"*
Yankee Contraband in the Río de la Plata

JERRY W. COONEY

THE merchant marine of the United States experienced an explosive expansion in the 1780s and 1790s. Not only did North American shippers search out new markets and trade routes, but sealers and whalers from New England penetrated the South Atlantic in large numbers. There, in the decade after the American Revolution, officials of the Spanish viceroyalty of the Río de la Plata viewed the maritime activities of these "anglos-americanos" with great suspicion. Spain was still jealously conserving her monopoly over commerce to the New World empire and earlier contact in the Caribbean with colonial North Americans had made royal officials aware of the persistent danger of smuggling from the far north. Nonetheless, by the 1790s reports of Yankees clandestinely trading with isolated Patagonian outposts reached the ears of authorities in Buenos Aires.[1] By that same period platine merchants had received royal permission to charter foreign vessels for the African slave trade. On the entrance of these ships into the Río de la Plata with human cargo, a few of them—North Americans included—carried contraband cargoes to supplement their profits.[2]

Any North American smuggling in the 1780s and early 1790s differed in kind and magnitude from what followed after 1798. The subsequent flood of contraband to the Río de la Plata in United States bottoms resulted from a dramatic change in Spain's international fortunes in the late 1790s. That nation's alliance with Revolutionary France in 1796 forced Madrid to turn the next year to neutral carriers for the commerce of her American empire.[3] Great Britain, now an enemy, dominated the North Atlantic sea-lanes and no longer could the Spanish merchant marine sustain the monopolistic trade between the peninsula and the Americas. In the South Atlantic the export-oriented ports of Montevideo and Buenos Aires experienced the arrival of neutral vessels engaging in the new commerce. Yankees, Portuguese, Danes, Hamburgers, even Ottomans, all were eager to supply the Plata with European-made goods and carry away in exchange hides, pastoral products, and, if possible, specie.[4]

In the wake of the neutrals came a problem that had long perplexed royal officials—contraband. Aware of that possibility, authorities from the beginning had placed restrictions on the neutral trade in order to salvage as much of the old monopoly as possible. Goods in the neutral carriers, even if shipped from nonimperial ports, had to be owned by Spanish American merchants. In theory, this new commerce was really a trade

*I wish to thank Dr. Benjamin Keen for permission to use, as part of the title of this article, a chapter title from his *David Curtis deForest and the Revolution of Buenos Aires* (New Haven, 1947).

1. Harry Bernstein, *Origins of Inter-American Interest, 1700-1812* (Philadelphia, 1945), pp. 34-35; and "Real orden que no se permita a Buque alguno . . . ," 9 May 1797 in Facultad de Fiolsofía y Letras, *Documentos para la historia argentina. Tomo VII. Comercio de Indias: Consulado, comercio de negros y de extranjeros (1791-1809)* (Buenos Aires, 1915), p. 129. Hereafter cited as *DHA*, VII, 129. Even after the estuary of the Río de la Plata became the focus for North American smuggling some Yankee traders still dealt clandestinely with Patagonian outposts. Keen, p. 15.

2. José M. Mariluz Urquijo, *El Virreinato del Río de la Plata en la época del marqués de Avilés (1799-1801)* (Buenos Aires, 1964), pp. 139-40. For the best study of the slave trade to the Plata in this era and one which does touch upon the North American involvement, see Elena F. S. de Studer, *El trato de negros en el Río de la Plata durante el siglo XVIII* (Buenos Aires, 1958), pp. 278-322.

3. "R.I Orn Permitiendo en Buques nacionales o extranjeros desde puertos de Potencias neutrales . . . ," San Lorenzo, 18 November 1797 in *DHA*, VII, 134-35. For Madrid's view of the neutral commerce see Jacques Barbier, "Peninsular Finance and Colonial Trade: The Dilemma of Charles IV's Spain," *Journal of Latin American Studies* 12:1 (May 1980), 21-37. Other mercantile reforms such as direct platine trade with foreign colonies, exchanging local products for local products, occurred at this time but they have little relevance to the North American contraband.

4. An overview of the neutral commerce to the Río de la Plata may be found in Sergio Villalobos R., *Comercio y contrabando en el Río de la Plata y Chile, 1700-1811* (Buenos Aires, 1971), pp. 80-90.

in neutral ships, not with neutrals. Those foreign vessels carrying away Spanish American products or specie were obligated to make a "retorno" to peninsular ports. And certain foreign-made items of commerce, earlier prohibited as imports to protect Spanish industries, were still illegal. All attempts to retain control over this new commerce were futile. Foreign shippers always discovered a platine merchant who, for a fee, acted as a "dummy" owner of goods imported.[5] Spanish Americans desired European goods (often of British—the enemy—provenance) whether prohibited or not. All too often that very prohibition made those goods that much more in demand. Both platine and foreign merchants cared little about an absurd "retorno" or, for that matter, any attempt to restrict the export of specie from the empire.

The contraband to the Río de la Plata after 1798 fell roughly into three categories. The most important was fine clothes and fabrics. The viceroyalty produced only rough cotton and wool cloth from cottage industries of the interior.[6] Spain itself manufactured finer items of apparel which were protected from foreign competition; but even before the wars of this era peninsular industries proved incapable of supplying the fabrics in demand in Spanish America. Now, not only was the demand higher because of curtailment of the legal Spanish supply but stocks of contraband earlier supplied by Spanish smugglers were low. Muslins, dimity, velveteen, batiste, linens, hats, shawls, dresses, even handkerchiefs, found a market in the New World at very high prices.[7]

Second in importance appeared to be paper products. Certain of these, such as playing cards and stamped paper, were profitable government monopolies supplied from Spain. Again, wartime scarcity prompted a great leap in prices. The third category may be considered miscellaneous European manufactures—often metal products—which might be legal in the neutral commerce. However, if one introduced other "prohibited goods," why then pay the high 32 percent tariff on those permitted? Of course, the smugglers generally desired specie in return and a hemorrhage of silver accompanied the contraband traffic.

5. A good example of the simulation of ownership is found in Keen, pp. 54-55.

6. Pedros Santos Martinez, *Las industrias durante el virreinato (1776-1810)* (Buenos Aires, 1969), pp. 38-50.

7. Mariluz Urquijo, pp. 127-28; and John Lynch, *Spanish Colonial Administration, 1782-1810. The Intendant System in the Viceroyalty of the Rio de la Plata* (London, 1958), p. 143.

The *John* out of Philadelphia in 1798 was the first North American vessel in the Río de la Plata in pursuit of the neutral commerce.[8] Within a year other Yankee ships arrived, trading either with the traditional port of Montevideo or at Buenos Aires through that capital's recently rehabilitated harbor, Ensenada de Barragán. A striking feature of the commerce—legal or illegal—was its well-organized, big business character. News of the opening of the Plata quickly reached North American ports; and through Spanish consulates merchants knew well what items of commerce were legal and which were not. In the years 1798 and 1799 the legal trade was satisfactory enough for many United States merchant houses, but even then they shipped small quantities of prohibited goods to test the controls of that region. The furtherance of the neutral commerce—as well as contraband—demanded more than casual, intermittent contact in the Río de la Plata or Caribbean ports, and platine and North American merchants rapidly discovered mutual benefit in the expansion of high-profit contraband. After initial contact was established it is really impossible to determine which of the two parties instigated the well-oiled, illegal traffic to the Río de la Plata.

By 1799, after only a year of intercourse, close ties became common. In that year Francisco de Sar, an important porteño merchant (and later member of the Buenos Aires *cabildo* or town council), dispatched to the United States Tomás O'Gorman, an Irish expatriate. There that agent purchased ships for Sar and concluded upon the merchant's behalf an import agreement with a Philadelphia merchant house.[9] O'Gorman, on the same voyage, acted similarly for Manuel de Sarratea, another porteño merchant and later a major figure in Argentine independence.[10] Meanwhile, representatives of merchant houses from the north visited Buenos Aires and Montevideo and interested *comerciantes* in profitable associations. Thomas Halsey of Providence, Rhode Island, visited the viceregal capital in 1799 and made there the acquaintance of Tomás Antonio Romero, the largest merchant in the Río de la

8. Charles Lyon Chandler, "Documents: The River Plate Voyages, 1798-1800," *American Historical Review* 23:4 (July 1918), 816.

9. "Ynstrucción para alegar las Causas justas . . ." (1799-1800?), in *DHA*, VII, 174-78.

10. Hernán Asdrúbal Silva, "The United States and the River Plate: Interrelations and Influences Between Two Revolutions," in Joseph S. Tulchin (ed.), *Hemispheric Perspectives on the United States* (Westport, Conn., 1978), p. 28.

Plata.[11] Romero then sent a protégé, José Antonio de Sanzetenea, north with Halsey to New England. In Providence, Sanzetenea purchased a ship destined for the slave trade in Romero's name and concluded on Romero's behalf important import arrangements with William Vernon and Associates of Providence.[12] By the early 1800s platine merchants did not have to send agents to the United States since such smugglers as David DeForest, Thomas Halsey, and other North Americans took up more or less permanent residence in Buenos Aires from where they coordinated trade for themselves and platine partners.[13]

All those early transactions for the legal import of goods suddenly were endangered by the decreed abolition of the neutral commerce in 1799. Too many complaints about that trade being used to facilitate contraband had reached Madrid; and too many defenders of the old monopolistic system of commerce still retained influence. What then could be done with those goods already contracted for in the United States on the account of various platine merchants? An accommodating viceroy, the marqués de Avilés, did allow a grace period in 1800 for imports already ordered.[14] But the wartime demand for European products remained as great as before and very useful foreign relationships had been cemented.

The continuing war, abolition of the neutral commerce, a high demand for goods, and a bureaucratic loophole all conspired to increase the contraband commerce to the Río de la Plata in 1800-1802. The means to carry on an illegal trade were found in a provision of the 1793 degree liberalizing the slave trade. Foreign-made ships could be purchased for that commerce.[15] By 1798 such prominent slavers as Pedro Duval and Tomás Antonio Romero bought craft, first in Brazil and then in the United States. Now in 1799, although the neutral commerce was outlawed, neutral constructed ships still sailed to Buenos Aires and Montevideo, there to pass into Spanish registry. Approximately thirty North American ships entered platine registry in the years 1799-1805, and while all of them probably were not involved in contraband, enough were to raise official suspicion.[16]

Contraband trade from North America began after the ship purchase in the United States and its inspection "in ballast" by a Spanish consul. Although the craft was then obliged by law to sail directly to the Plata as inspected, goods were loaded upon it "on the account and at the risk" of the platine merchant in whose name the ship was bought.[17] While certain commodities such as iron bars, lumber, and salt counted as ballast and most ships carried them, the greatest profit was in fabrics, fine clothes, and manufactures. Warehouses in the United States supplied some of the contraband, but for maximization of profits the ship sailed to Europe to acquire those illegal goods. A notorious case involved the *Mariana* (*Mary Ann*), purchased for Tomás Antonio Romero in Providence by that merchant's agent, Sanzetenea.[18] After inspection in Boston, the vessel acquired a cargo of clothing, cloth, paper, and other goods in Amsterdam and London.[19] Not only did Sanzetenea sail on this ship but so did Thomas Halsey, son of the Providence merchant who sold the *Mariana*.

The South Atlantic voyages of these ships presented some risks. As Spain was at war with Great Britain these vessels, even though sold to the Spanish, bore the American flag. If stopped by British naval units, the goods aboard were also claimed to be North American owned. However, at the height of the contraband trade to the Plata the American flag itself presented a danger. From 1798 to 1801 French privateers operated out of African ports and during the Franco-American Unde-

11. Fiscal (Legal Advisor) José Marquez de la Plata to Viceroy Joaquín del Pino, Buenos Aires, 28 July 1802 in Archivo General de Indias (Seville), Audiencia de Buenos Aires, Legajo 130. Hereafter cited as AGI-BA 130. The best treatment of Romero to date is Raúl Galmarini, "Comercio y burocracia colonial: a propósito de Tomás Antonio Romero," *Investigaciones y Ensayos* (Buenos Aires), 28 (enero-junio 1980), 407-39, and 29 (julio-diciembre 1980), 387-424. This important figure deserves a biography.

12. Asdrúbal Silva, p. 28.

13. "Sobre los Males que ocasiona al comercio con colonias extranjeras . . . ," Consulado de Buenos Aires, Buenos Aires, 16 March 1805 in Archivo General de la Nación (Buenos Aires), Legajo 9-4-7-8. Hereafter cited as AGN 9-4-7-8. Also see Keen, pp. 48-56.

14. "Memoria a su sucesor D. Jaoquín del Pino," D. G. de Avilés y del Fierro, Buenos Aires, 21 May 1801 in Sigfrido Radaelli (ed.), *Memorias de los virreyes del Río de la Plata* (Buenos Aires, 1945), p. 513.

15. "Real Orden concediendo facilidades para el envio de Negros . . . ," Aranjuez, 24 January 1793 in *DHA*, VII, 13.

16. For the creation of a merchant marine in the Río de la Plata by this means, see Jerry W. Cooney, "Neutral Vessels and Platine Slavers: Building a Viceregal Merchant Marine," *Journal of Latin American Studies* 18:1 (May 1986), 25-39. Ships purchased in Brazil were also involved in contraband but that is a separate tale.

17. "Testimonio" of Capt. Daniel Olney of the *Mariana*, Ensenada de Barragán, 27 May 1801 in AGI-BA 218.

18. "Testimonio del expediente . . . presentado por D. Tomás Antonio Romero . . . ," Aranjuez, 22 March 1802 in AGI-BA 130.

19. "Interrogación de Guillermo de la Quintana," Buenos Aires, 22 March 1801 in AGI-BA 128.

clared Naval War they snapped up luckless United States merchant ships in the South Atlantic. The recently created United States Navy operated in North Atlantic waters and afforded no protection for the ships bound for the Pacific, Río de la Plata, Africa, or the Indian Ocean. As an ally of Spain, those Frenchmen had port privileges at Montevideo.[20] The *Alert,* captained by Robert Gray, on its way to the Pacific Northwest and China, was captured off Río de Janeiro in December of 1798. It subsequently passed through an agent of the French in Montevideo and was sold to a platine merchant.[21]

The most notable example of a North American smuggler to the Río de la Plata captured by the French was the *Mentor* out of Portsmouth. That ship was bound for Montevideo and taken by privateers off the southern coast of Brazil in July of 1800. On board the *Mentor* the French discovered a contraband cargo destined for the estuary. The French sold the ship to a local merchant, Juan Vives, but the latter wisely disclaimed all responsibility for the cargo. In Montevideo Tomás Antonio Romero appeared and with documentation attempted to prove that the ship was his, purchased for him by the United States. He also disclaimed any ownership of the contraband aboard. After a long and confused legal battle the *Mentor* passed to Vives.[22]

Often no attempt was made to conceal contraband aboard ships in this era. There was little point if large cargoes of illegal goods were to be unloaded in some isolated roadstead. The *Mariana's* contraband when discovered was clearly marked with an M.A. (for *Mary Ann*) on all chests and bales.[23] But if captains were audacious enough to sail the purchased craft directly to legal ports, sophisticated concealment methods were employed. The *Mentor,* after its capture, was found to have a "quantity of illegal commerce well hidden between bulkheads and in secret passages."[24]

On arrival in the estuary a major concern of captains was coordination with the platine merchant-owner to unload the contraband. Uncertainty about the time of arrival in the age of sail demanded that the captains initiate contact if it earlier had been agreed that discharge of the cargo be effected in some isolated spot in the vast estuary. One solution, utilized at least several times, was to place ashore a small party or a single sailor to journey overland to Buenos Aires or Montevideo.[25] The merchant was then apprised by a sailor of the ship's arrival and where it was hovering in the Río de la Plata. By a small launch to the ship, arrangements were made to unload it. To the east of Buenos Aires along the south shore were many isolated roadsteads where local boats received the cargo, the same near the mouth of the Paraná River. Goods were secreted away in remote spots in the countryside or among the many islands of the river delta.

If the ship appeared at a legal harbor carrying contraband, arrangements were different. Concealment aboard the ship (as with the *Mentor*) or bribery of officials was imperative. The goods were then clandestinely unloaded at night into small boats.[26] Once ashore the contraband usually was not brought into the viceregal capital or Montevideo until it could be sold quickly. A long warehousing of large quantities of illegal goods in the port cities was risky; better to chance discovery in the countryside with no clear owner evident.

For all the ease of smuggling, captains did encounter dangers in the estuary. One precaution that North Americans commonly took was misleading documentation of ownership of cargo; or if apprehended with illegal items, simply to declare that on the voyage south all papers had been thrown overboard for fear of interception by a sighted British naval vessel. Ownership of contraband, even of the ship itself, was then confused to a point that no legal action could be taken against any involved platine merchant.[27]

The most obvious risk was the Resguardo, the body charged with the enforcement of mercantile and revenue laws and which was directly responsible to the viceroy. Time and again it was evident that Resguardo officers

20. "El Exmo S.or D.n. Mig.l Josef de Azanza . . . ," San Lorenzo, 3 January 1796 in *DHA,* VII, 104.

21. Chandler, "River Plate Voyages," p. 818; and José de Bustamante y Guerra to Viceroy Antonio Olaguer Feliú Buenos Aires, 25 January 1799 in AGN 9-1-2-4.

22. Council of the Indies, Madrid, 5 May 1802 in AGI-BA 431.

23. Viceroy Pino to Ministro de Hacienda Miguel Cayetano Soler, Buenos Aires, 18 August 1801 in AGI-BA 218.

24. Council of the Indies, Madrid, 5 May 1802 in AGI-BA 431.

25. Gabriel Casado to Viceroy Avilés, Isla de San Gerónimo, 18 March 1801 in AGI-BA 128; and "Año de 1801. Testimonio de las diligencia . . . de la fragata Americana nombrada el Fenis de Boston," Buenos Aires, 20 December 1803 in AGI-BA 134.

26. Comandante del Resguardo León de Altolaguirre to Viceroy Pino, Buenos Aires, 2 November 1801 in AGI-BA 431.

27. "Declaración" of Daniel Olney, Ensenada de Barragán, 10 June 1801 in AGI-BA 590.

colluded with smugglers.[28] When the *Mariana* surreptitiously unloaded its cargo into boats off the delta, a launch of that force actually aided the operation.[29] Not only did minor members take bribes but corruption reached high-ranking officials. When the *Mentor* was under guard in Montevideo passing through adjudgment as a French prize, the officer in charge of Montevidean enforcement, Don Manuel Capriano de Melo, discovered certain papers hidden in a wedge of a mast. He delivered them directly to the merchant, Tomás Antonio Romero, who claimed that that ship had been purchased for him in the United States. Superiors of Melo stated later that those documents probably proved Romero's ownership of the contraband aboard as well. But after the officer had tampered with the evidence the papers were useless in court.[30]

The viceroy marqués de Avilés (1799-1801) recognized that the Resguardo was the main line of defense against smugglers and he created within it a naval unit solely to handle the problems of the estuary.[31] A few officers were diligent and honest and some lawbreakers captured. No doubt Avilés' reform effected an improvement, but as the letters of Comandante del Resguardo León de Altolaguirre revealed in 1801 and 1802, there were major obstacles to the efficient enforcement of the law. Altolaguirre bombarded the viceroy with continual complaints of insufficient manpower and lack of enforcement craft. In August of 1801 he reported a concentration of merchant ships (one clearly a North American) on the south shore of the estuary some distance from Buenos Aires. The Resguardo vessel in that vicinity fired upon the group and chased them, but their superior speed enabled them to elude the law.[32] The *Fenis* (*Phoenix*) out of Boston became a special frustration to the comandante. In January of 1801 it was reported in the Río de la Plata but escaped apprehension.[33] Later in November it again appeared for two months off Punta de Piedras, an isolated roadstead to the east of the capital and a favored locale for smuggling. Altolaguirre complained that with only one craft for the south shore it was extremely difficult to contain contraband.[34] Three weeks later, to the chagrin of the comandante, the *Fenis* was captured—but not by the Resguardo. A ship owned by the merchants guild or *consulado* of Buenos Aires triumphantly brought her into Ensenada de Barragán.[35]

Beyond sea duties the Resguardo mounted guard over ships that entered Ensenada de Barragán or anchored off Montevideo. Officers made a *visita* and checked manifests versus cargoes. During the 1799-1801 prohibition of neutral commerce *visitas* generally kept pace with those ships arriving during the grace period and after. Still, some vessels might wait several months before an inspection.[36] In the meantime guards nearby were necessary as captains took advantage of darkness to unload cargoes into boats. In December of 1801, shortly after neutral commerce was restored, Altolaguirre protested to the viceroy that the North American *Yanch* (*Yankee*) had been three months in port without inspection. The crew had attempted "certain clandestine unloadings," and the sole officer of the Resguardo preventing those practices was now ill.[37] The Resguardos had no more men to spare. The comandante was correct in his suspicions for when the *Yanch* was visited, it was found to carry "120 pieces in excess of its manifest."[38]

The Resguardo was the victim of cheese-paring economy and lack of bureaucratic support. No doubt that had even more men and craft been available the contraband traffic would still have existed. But given the viceroyalty's reluctance to support adequately effective law enforcement in the estuary—even though new conditions warranted such support—the government acted against its best interests. Relatively low pay contributed to bad morale. Furthermore, while officers were entitled to a reward based on the value of the contraband they discovered, those awards became entangled in red tape and were slow in arriving. As a consequence, too many

28. Fiscal José Marquez de la Plata to Viceroy Pino, Buenos Aires, 28 July 1802 in AGI-BA 130.

29. "Declaraciones del Patrón y marineros de la lancha de Writt," Buenos Aires, 26 September 1801 in AGI-BA 218.

30. Council of the Indies, Madrid, 5 May 1802 in AGI-BA 431.

31. Mariluz Urquijo, p. 157; and Royal Order, Aranjuez, 6 February 1802 in AGI-BA 431.

32. Altolaguirre to Pino, Buenos Aires, 25 August 1801 in AGI-BA 431.

33. Altolaguirre to Avilés, Buenos Aires, 14 January 1801 in AGI-BA 431.

34. Altolaguirre to Pino, Buenos Aires, 30 November 1801 in AGI-BA 431.

35. Altolaguirre to Pino, Buenos Aires, 18 December 1801 in AGI-BA 431.

36. Altolaguirre to Pino, Buenos Aires, 23 November 1801 in AGI-BA 431.

37. Altolaguirre to Pino, Buenos Aires, 8 December 1801 in AGI-BA 431.

38. Altolaguirre to Pino, Buenos Aires, 23 December 1801 in AGI-BA 431.

officers turned to the comerciantes who paid them quick, good bribes.

Should smugglers, with all their advantages, still be apprehended, only foreigners and "small fish" felt any brunt of the law. The important platine merchants who bankrolled and masterminded the contraband trade at their end had too much protection and influence. The most telling case was the affair of the *Mariana,* which, after secretly unloading cargo in March of 1801, brazenly sailed to Ensenada de Barragán to undergo change of registry. In the meantime authorities had arrested five crewmen who earlier had been set ashore, one with a letter to Tomás Antonio Romero. The letter was allowed to be delivered.[39] The arrogant actions of Romero, Sanzetenea (Romero's agent in the entire transaction), and the young North American Thomas Halsey, forced the Resguardo to search for and find large quantities of contraband hidden in the delta.[40] In the course of the search an official discovered a letter from Romero to Sanzetenea urging speed in the discharge of the cargo and implicating some of the Resguardo in the unloading.[41] Other than a house arrest (while friends conducted his business for him), nothing happened to the merchant. The viceroy, a personal enemy of Romero, believed the evidence to be conclusive. Nonetheless, within a year and a half the comerciante was exonerated of all wrongdoing. He received full possession of the *Mariana* and Viceroy Joaquín del Pino stood humiliated.

In the course of this investigation Romero insolently denied all, blaming any contraband on Thomas Halsey and Sanzetenea, both of whom conveniently fled to Brazil.[42] Viceroy Pino found his own legal staff strangely dilatory and incompetent. In the Treasury and even in the Audiencia of Buenos Aires Romero had friends and supporters. The viceroy then discovered that not even the Madrid government supported him. The platine merchant had agents close to Manuel Godoy, Prince of the Peace and power behind the throne.[43] By late 1803, the viceroy abandoned the unequal battle.

39. "Auto" of the Audiencia of Buenos Aires, Buenos Aires, 27 April 1801 in AGI-BA 218.

40. Altolaguirre to Pino, Ysla de la Palma, 5 July 1801 in AGI-BA 218.

41. Tomás Antonio Romero to José Antonio de Sanzetenea, Buenos Aires, 28 May 1801 in AGI-BA 218.

42. "Declaración" of Romero, Buenos Aires, 29 August 1801 in AGI-BA 590.

43. Pino to Ministro de Hacienda Soler, Buenos Aires, 28 December 1803 in AGI-BA 132; and Galmarini, 29, 412-15.

The fate of Resguardo officers and North Americans apprehended in the *Mariana* affair revealed also a hesitant attitude to law enforcement. To be sure, certain officers were arrested and briefly imprisoned, but dismissal from the service was their major punishment.[44] Capt. Daniel Olney of the *Mariana* was interrogated and then imprisoned with certain of his crew in the Fortelaza of Buenos Aires for better than a year.[45] The other crew were just detained aboard the sequestered vessel. By 1803 Olney and his crew were released. In the meantime he and other North American captains of ships detained for one reason or another in the estuary dispatched a protest to Charles Pinckney, United States minister to Spain. They complained of the treatment that Viceroy Pino gave them and accused him of a "mean and mercenary spirit of plunder on one hand and a shameful neglect or ignorance of duty on the other." Under the pretext of halting contraband, inordinate delays and petty harassment had been the fate of many North American ships. The captains demanded a redress of grievances.[46] All knew that many North Americans in the Río de la Plata were heavily involved in contraband but Spain, in view of the international situation, wished no serious conflict with the United States over too severe a treatment of smugglers. Yankees resident in Buenos Aires and Montevideo, as long as they displayed moderate discretion, were not even ejected from the viceroyalty.

The peace between Spain and Great Britain from 1802 to 1804 resulted in fewer North American ships in the estuary, even though the neutral commerce again was permitted. Nonetheless, ship purchases in the north and subsequent smuggling continued. It was just conducted with more care than Romero had displayed earlier. In 1803 the Administrator of the Customs of Buenos Aires complained to Viceroy Pino that purchased ships arrived in the estuary fully laden with goods, unloaded their cargoes clandestinely, and then innocently presented themselves for change of registry

44. Manuel Cipriano de Melo was involved in both the *Mentor* and *Mariana* scandals. He was dismissed in 1802 but evidently solely on the grounds of his misconduct in the *Mentor* case. Royal Order, Aranjuez, 27 May 1802 in AGI-BA 431. For arrest and treatment of other Resguardo implicated in the *Mariana* affair see Entry of D. Benito de Lazaval, Buenos Aires, 7 March 1803 in Escribanía de Marina AGN 9-49-3-3.

45. Entry of Juan Viola, Buenos Aires, 4 October 1802 in the Escribanía de Marina, AGN 9-49-3-3.

46. Daniel Olney, et al., to United States Minister to Spain Charles Pinckney, Buenos Aires, 22 April 1802 in Charles Lyon Chandler, *Inter-American Acquaintances* (2nd ed. rev., Sewanee, Tenn., 1917), pp. 35-37.

"feigning that they come purchased" by some local merchant.[47] The viceroy knew this but did little; he already had been burned by the *Mariana*.

War again raged between Great Britain and Spain by late 1804. The arrival of North American vessels in the Río de la Plata, and also contraband, accelerated.[48] The Resguardo still suffered from corruption.[49] The new viceroy, the marqués de Sobremonte, did little to stem the flow of illegal merchandise. By 1805 the Consulado of Buenos Aires bluntly stated that foreigners and their platine associates "practise contraband with such frankness and scandal that it touches the limits of belief"; and that smuggling will lead to "the inevitable ruin of the national industries," "corrupt mercantile faith," and "foment vices most ruinous to commerce."[50] Comerciantes with membership in the Consulado merrily continued their illegal acts.

The British invasion of Buenos Aires in 1806 found a substantial community of North Americans resident in that city, along with other foreigners. During the occupation of the viceregal capital certain Yankees aided the invaders, the most notable being that shadowy figure, the unscrupulous William P. White.[51] He, as others, believed that British control of the Plata would result in even greater trade opportunities. But on the expulsion of the enemy in 1806 and then again in 1807, foreigners, particularly the North Americans, experienced the wrath of triumphant patriotic criollos. Victorious porteños submitted in 1806 a representation to the capital's Cabildo signed by a multitude of citizens and merchants of this city in which they requested the expulsion of foreigners; that commerce with foreign colonies no longer be tolerated; and that the arrival of North American vessels coming with royal permission cease.[52] Nonetheless, within a year or two some North American ships still at sea during President Jefferson's embargo did return to the Plata. The confusion in that region with Spain's change of alliances and the embargo itself did signify, however, that Yankee shipping was not as evident as before.[53]

The inability of royal officials to enforce effectively the trade laws in the Río de la Plata dramatically demonstrated bureaucratic demoralization as well as the power of local merchants. The empire, sorely beset by the problems of the Napoleonic Era and suffering poor leadership, had no desire to alienate any of its elites. Too many other pressing problems were at hand. In turn, those same elites saw little utility in the traditional Spanish monopoly and control over trade. The introduction to new international commerce encouraged that challenge to the old system. Corruption at all levels of the viceregal government ensued. Why should any official not profit from the contraband trade when it was obvious that Madrid itself had no intention of strongly enforcing the law? Of course, the North Americans involved in contraband had no regard for the Spanish Empire or the old trade system. They were simply motivated by the pursuit of profit. For thinking Spanish Americans, however, it was only a short step from contempt for, and challenge to, imperial trade policy to a questioning of Spanish control in larger matters. International trade was insidiously subversive and it is not at all surprising that merchants of Buenos Aires played a major role in the coming Independence Movement in this region in the 1810s.[54] The role of Yankee contraband as a prodrome to independence defies any exact assessment, but certainly it played a part in the breakdown of imperial power in the viceroyalty of the Río de la Plata.

47. Administrador de la Aduana de Buenos Aires José de Proyet to Viceroy Pino, Buenos Aires, 13 August 1803 in Sergio Villalobos R., "Notas históricas y geográficas: Dos informes sobre el comcercio en el Virreinato de Buenos Aires," *Revista Chilena de Historia y Geografía*, no. 130 (1962), 366-70.

48. For a glimpse of a Yankee smuggler in operation in this period see Keen, pp. 34-36.

49. Viceroy Sobremonte to Soler, Buenos Aires, 29 October 1804 in AGI-BA 431.

50. Consulado of Buenos Aires to Viceroy Sobremonte, Buenos Aires, 16 March 1805 in AGN 9-4-7-8.

51. Carlos Roberts, *Las invasiones inglesas del Río de la Plata (1806-1807)* (Buenos Aires, 1938), pp. 36-37, and 120.

52. "Representación del vecindario y comercio . . . ," Buenos Aires, 25 September 1806 in Archivo de la Republica Argentina, *Antecedentes políticos, económicos y administrativos de la Revolución de Mayo* (Buenos Aires, 1924), I, 9.

53. Keen, p. 57.

54. A good recent work on the subversive impact of international trade to the Spanish Empire is Peggy Liss, *Atlantic Empires: The Network of Trade and Revolution, 1713-1826* (Baltimore, 1983), passim.

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"Mad Jack" Percival in Vietnam: First American Hostilities, May 1845

DAVID F. LONG

THE Vietnamese coast lay directly ahead and Capt. John Percival could reflect that so far his command of USS *Constitution* had been relatively pleasant and successful. He had stood out of New York City in May 1844, sailing "Old Ironsides" to Brazil, then nonstop to Madagascar, and on to Sumatra, Singapore, and Borneo. His orders from the Secretary of the Navy emphasized his primary responsibility: to discover new opportunities for American commerce in his ports of call around the world, during which "You are necessarily vested with a great deal of discretion," a permission that the captain would stretch to the limit.[1]

Few American naval officers were better known than Percival, for he had become a legend in his lifetime, partly through his own efforts. A man who publicly referred to himself not only as "Mad Jack" but also "Crazy Jack" and "Roaring Jack"—and occasionally acted in accordance—was sure to be the subject of scuttlebutt among his colleagues and eventually to attract the national eye. Nathaniel Hawthorne met him at the Boston Navy Yard during the 1830s, and stressed this aspect of his character with the perception of a great novelist: Percival had "an eccentric expression in his face, which seemed partly wilful, partly natural.... He seems to have moulded and shaped himself to his own whim, till a sort of rough affectation has become thoroughly imbued throughout a kindly nature."[2]

Until Percival received his permanent naval commission in 1812, fact and fiction since his birth in 1779 had become so intermingled as to confound his biographers about his early years. Impressment into and a daring escape from the Royal Navy may be authenticated; not so the yarn about his navigating alone a sloop 3,000 miles from West Africa to Brazil after his crew had fallen prey to yellow fever. A novel published in 1855 muddied rather than clarified his pre-naval career. Under the pseudonym "Harry Gringo," Henry A. Wise, who had served with Percival for five years as a midshipman, devoted 436 pages in his *Tales for the Marines* to the fictional cruise of one "Captain John Percy," known as "Mad Jack." It is a wildly improbable story of bloodshed galore, hair's-breadth escapes, and horrid ends for the blackest-hued villains. Throughout, Wise's admiration for his commander is unbounded:

> He was a man of over sixty . . . who had a handsome face and regular features and was tight and proper in build.... He seemed to have been born a sailor . . . a very paragon of a seaman.... He was not a man of education, but of excellent natural parts.... He was subject to the most ungovernable passion at times, chiefly about trifles, but on occasions of real danger, he was as cool as marble.... Notwithstanding his very severe and often harsh conduct toward his crew, they fairly worshipped him . . . and knew that he never gave an order that he could not perform himself.[3]

One of Percival's naval colleagues described him as "very energetic, and altho' very rough in manner and excitable in temper, yet is very reliable . . . with much good sense and good feeling and is disposed to do everything that may in any way forward the interest of the Service."[4] In an article a naval historian referred to his "skill in the seaman's art, his physical intrepidity, his iron will, his reckless daring—which won the sailors' hearts."[5]

After a meritorious career during the War of 1812, he

1. Sec. Nav. David Henshaw to JP, 22 January 1844, K. Jack Bauer, ed., *New American State Papers, Naval Affairs, 1789-1860*, 10 vols. (Wilmington, Del., 1981), vol. 3, 81-82.

2. Linda McKee, " 'Mad Jack' and the Missionaries," *American Heritage*, vol. 22 (April 1971), 31-32.

3. "Harry Gringo" (Henry A. Wise), *Tales for the Marines* (Boston, 1855), 25-26.

4. Charles Wilkes, *Autobiography of Rear Admiral Charles Wilkes, 1798-1877*, ed. by William J. Morgan, et al. (Washington, 1978), 361-62.

5. Allan Westcott, "Captain 'Mad Jack' Percival," *U.S. Naval Institute Proceedings*, vol. 61 (1935), 319.

first came into the national spotlight while commanding USS *Dolphin* at Hawaii in 1826 (this has been recounted by Linda McKee in " 'Mad Jack' and the Missionaries," *American Heritage,* April 1971). Suffice it to say here that when Percival discovered that American missionaries had put a ban against girls coming out to entertain his sailors, a service granted a short time before to the crew of a British man-of-war, he exploded in profane wrath. Some of his men rioted ashore, manhandling the leading missionary, until they were quelled, partly by Percival himself who quickly had the guilty flogged. Yet his pressure remained so unrelenting that the tabu was rescinded, following which the mission schools were emptied, "the girls pouring out in a steady stream for the three months the happy ship was in port."[6] Understandably the outraged missionaries heaped upon him such epithets as "lewd," "scandalous," "vulgar," and "obscene" for behavior that one of them mourned had made "hell rejoice and angels cover their faces in grief."[7] The American Board of Commissioners for Foreign Missions charged him with a variety of offenses. He was brought before a Navy Department court of inquiry at Boston during 1828, although it cleared him by declaring that the evidence presented made a court-martial neither "necessary nor proper."[8]

After an unusually long leave of absence, perhaps as punishment for his Hawaiian escapades, Percival cruised in the West Indies, off Brazil, and in the Mediterranean, interspersed with navy yard assignments. He was given *Constitution* as a fitting cap to top off his naval career.

Arriving in Annam at Tourane (later Danang), Hué's seaport, on 11 May, the captain anticipated nothing more than the watering and provisioning of his ship, while exchanging amenities with local dignitaries. The Vietnamese had endured over eight hundred years of Chinese rule before liberating themselves, c. A.D. 900. They were separated into three political entities: Tonkin to the north at Hanoi, Cochinchina to the south at Saigon, and Annam in the center at Hué. Under Gia Long, the first emperor of the Nguyen dynasty, the Annamese managed to unite the country just before 1820. Within a few years his successors, Mang Minh and Trieu Tri, found themselves in a bind. French priests had infiltrated Vietnam for many years, converting some 300,000 to Catholicism. These missionaries, abetted by their supporters in Paris, worked hand-in-glove with the French Navy, desirous of a base in the Far East to offset those of the British in Singapore and Hong Kong. Both emperors were anti-foreign, fearing a Catholic fifth column. They had to act with circumspection, however, imprisoning priests but without killing any after 1838. They thought that the French would seize upon any excuse to invade and conquer.[9] That is what eventually happened; by the early twentieth century Vietnam, with Laos and Cambodia, was locked into French Indochina.

To return to 1845: matters started auspiciously for Percival in Tourane, with his crew loading water and supplies aboard for the first three days. On the fourteenth he entertained a party of high-ranking Annamese nobles ("mandarins") in his cabin. Everything was amiable until the delegation was leaving. Their interpreter slipped Percival a note, whispering that he was a dead man should he be discovered. It was signed by Dominique Lefevre, a Catholic Bishop, and addressed to the French admiral commanding in East Asia. He appealed for rescue at the earliest possible moment, for he and twelve Vietnamese converts were "under the sentence of immediate death."[10] Lefevre might well have been called "Your Persistency." He first came to Vietnam in 1835 and until he died over forty years later he was repeatedly arrested, tried, and sentenced to banishment or execution, either escaping or being released, only to sneak back once more.

The impetuous Percival started at once a rescue mission, apparently with the support of his officers. Lieutenant John B. Dale wrote in his journal: "Here was an opportunity of a rescue from this semi-barbarous nation. It was enough to know that a fellow Christian was in danger of his life. Humanity was to be our war-

6. William Stanton, *The Great United States Exploration Expedition of 1838-1842* (Berkeley, et al., 1975), 222.

7. American Board of Commissioners for Foreign Missions, *Annual Report, 1827* (Boston, 1827), 81.

8. "Findings of the Court of Inquiry of Lt. Percival in the Sandwich Islands [Hawaii] in 1826," copy given me by Commander Martin.

9. (For Vietnamese backgrounds) Joseph Buttinger, *The Smaller Dragon: A Political History of Vietnam* (N.Y. and London, 1958), 326-35; John F. Cady, *The Roots of French Imperialism in Eastern Asia* (Ithaca, 1954), 57-61, 73-74, 217; Stanley Karnow, *Vietnam, A History* (N.Y., 1983), 55-69; D. J. C. Tate, *The Making of Modern South-east Asia,* 3 vols. (Kuala Lumpur, et al., 1971), vol. 1, *The European Conquest,* 432-47.

10. Benjamin F. Stevens, Percival's secretary, 1844-1846, "A Cruise on the *Constitution:* Around the World in Old Ironsides—1844-1847," *The United Service,* vol. 5 (June 1904), 698-700.

rant [rather] than the law of nations."[11] That same day the captain strode along a line of eighty sailors and marines stretching from *Constitution* to the house of the top Annamese official. Percival insisted that "the King of Cochin China" (Americans did not realize that power resided in Hué, not in Saigon) be notified that the French cleric must be turned over to him within twenty-four hours, adding that he would take and hold hostages until then. If met with defiance he would hammer down the city's three forts and apprehend all the shipping in the harbor. He abducted three "mandarins" and two of their attendants without opposition, marching them back to his frigate. He immediately wrote Lefevre about what had transpired, and a few days later promised to carry out his threats to the "King" unless the bishop were surrendered to him forthwith. On the fifteenth he dispatched sailors to swarm aboard three armed junks riding at anchor, again without resistance.[12]

Five days dragged by while the frustration of Percival and his men heightened. On the nineteenth he received word that a delegation from Hué had arrived to discuss the matter, but when he went ashore, no one answering to that description could be spotted. That night the captain, "finding that the hostages had no influence," freed them, hoping that this demonstration of good will might break the logjam. On the twentieth the three junks tried to escape but were hunted down and recovered, during which some Vietnamese sailors died, most of them from drowning. Four days later a message arrived that Lefevre would be freed if the junks were returned. This was done, once more without result; the bishop remained in prison.[13]

Communications ceased on the twenty-fifth after Percival announced that he was leaving for China where he would report this outrage to the French who would undoubtedly retaliate harshly. The Annamese responded that he could threaten as he wished but they would accept no further insulting messages from him. By this time additional Vietnamese warships were coming in and their forts were being reinforced. It became obvious to Percival that with his single, antiquated, late eighteenth-century frigate he was helpless offensively. Sixteen wasted days after his advent the beaten captain weighed anchor.[14]

Granting that Percival had been motivated by a most generous and admirable humanitarianism, nonetheless at Tourane he had demonstrated how naval diplomacy should not be conducted. Had he carefully thought through his situation before reacting as he did, he could have realized that once he seized hostages and warships, if his ultimatums were ignored, he had stripped himself of acceptable options. Undoubtedly the Annamese recognized almost immediately that in order to defeat him they had to do practically nothing. They could easily let the days slip by until the onset of disease, depleted supplies, or the fulfillment of other responsibilities compelled him to depart. Even if Percival had bombarded Tourane, any damage could easily be repaired. In short, he had nothing of the force necessary to make a sizable nation bow to his demands.

Coming into China on 7 June the captain promptly notified the French admiral about his recent activities, and a few days later Lefevre was turned over to the commander of a French man-of-war.[15] Percival also gave evidence about his concern as to how Washington would look upon his behavior at Tourane. He took until the twenty-first before writing a long dispatch to the Navy Secretary, detailing the sequence of events there, and emphasizing that throughout he had been placed in a most unusual and awkward position. If Lefevre had been an American citizen his course would have been clear: to "free him at all hazards." But in this case:

> I looked to my instructions to bear me out: how far the Department may coincide in the view I have taken of the extract below, is a matter of much anxiety.
>
> Every encouragement and assistance in your power will be afforded to American commerce and American citizens as to those friendly nations you will meet during your cruise.
>
> The motives which influenced me were humane; exerted in the cause of suffering humanity, to aid the subject of a Nation long in amity with the United States. If I have erred, it is an error of the head and not the heart which at all times is devoted to my country's honor and prosperity.[16]

The Polk administration cold-shouldered his justifi-

11. "Journal of Fifth Lieutenant John B. Dale, 29 May 1844-27 September 1846," 14 May 1845, p. 10, copy given me by Commander Martin.

12. Ibid., 14-15 May 1845, pp. 10-11; Stevens, 700-701.

13. Dale, "Journal," 16-24 May 1845, pp. 12-16; Stevens, 702.

14. Dale "Journal," 25 May 1845, pp. 16-17; Stevens, 702.

15. JP to "Admiral Commanding French Naval Forces, China Seas," 7 June 1845, USND, Record Group 45, Captains' Letters, M 125, roll 322.

16. JP to Sec. Nav. George Bancroft, 21 June 1845, roll 322.

cations at once. Navy Secretary George Bancroft scrawled an angry marginal note on the above letter: "The Department wholly disapproved the conduct of Captain Percival as not warranted either by the demands of the Bishop or the Law of Nations."[17] Bancroft's correspondence does not make clear why he took such an immediate and negative reaction to this occurrence, but reasonable explanations are not hard to find. He feared that Percival's abject failure to liberate the Frenchman might result in a commensurate loss of national prestige in East Asia. Moreover, "Mad Jack" had resorted to force without the excuse of punishing pirates and tribesmen for atrocities committed upon Americans. In contrast, Capt. John Downes in 1832 and Comm. George C. Read in 1838-1839 had justifiably chastised pirates in Sumatra, as had Lt. Charles Wilkes who burned Fijian villages in the Pacific, 1838-1842. Finally, by killing persons living in an area where successive secretaries of the navy had considered wide open for expanded American trade, Percival had temporarily at least closed the door on that opportunity.

Washington's disavowal of the captain's conduct in Vietnam was continued and enhanced by follow-up reports from Southeast Asia. Early in 1847 William John Butterworth, British governor in Singapore, wrote a colleague in India that merchants coming from Annam were telling him that harsher restrictions against foreign commerce had just been imposed there, because of "the American ship *Constitution*, when that vessel fired upon and destroyed several of the inhabitants." Moreover, Emperor Trieu Tri in Hué was "anxious to show his subjects that the insult offered to him had not been passed over with impunity."[18] About the same time, Joseph Balestier, U.S. consul in Singapore, confirmed these developments. He informed Secretary of State Buchanan that he had received a formal complaint from the "King" about the deaths and injuries to his people inflicted by the Americans.[19]

Indeed, Balestier himself was sent as a "Special Agent and Envoy" to Southeast Asia, remaining at Tourane for several days during February and March 1851. He carried with him presents for the new Emperor Tu Duc and a letter from John Tyler apologizing for what had occurred in 1845, and expressing a hope that a commercial agreement between the two countries might be written. But the president ended with a threat couched in a remarkably convoluted sentence. If his "letter of friendship and conciliation" and his offer to "make amends" for an "act of hostility by an officer of the United States against his kingdom" were rejected and the Vietnamese persisted "in harboring enmity" against Americans who "fell into his power," then he would "feel himself obligated to send armed ship to Anam [*sic*] to demand explanations for such revengeful feelings."[20]

Conceding that Tyler's menacing tone would be hard to explain away, Balestier was hardly the man to do it. Both his correspondence and actions show him to have been "unreasonable, irritable, and captious."[21] In Tourane he focused his resentment upon the unwillingness of "mandarins" with whom he met to forward Tyler's letter to their ruler. He angrily terminated both his conference and his visit when the Annamese placidly denied that Percival's aggressions had even occurred; they had "searched the records of the country" and found no reference to it.[22] This also appears to have ended American-Vietnamese relations until the mid-twentieth century. As French tentacles wound tighter around it, anything pertaining to Vietnam would be discussed by Washington, not with Hué, but with Paris.

Comparisons between this initial contact and those a century and a quarter later must be used most gingerly. In 1845 at one port a single U.S. warship and a few hundred Americans were concerned for some two weeks. Casualties among them were nil and its repercussions temporary and limited. The recent hostilities involved the United States in all of former French Indochina for a decade and a half. Hundreds of thousands of Americans served there, suffering a death toll of almost 60,000. The presidencies of Lyndon B. Johnson and Richard M. Nixon were at least partially ruined. The nation had to endure perhaps its deepest internal divisions since the Civil War. In 1975 Americans were forced to realize that despite their expenditure of so much blood, materiel, and money they had suffered the worst military and diplomatic defeat in their history.

17. Ibid.

18. Henry John Butterworth to ?, n.d., in D. G. E. Hall, *A History of Southeast Asia*, 2nd ed. (London and N.Y.), 609-10.

19. Joseph Balestier to Sec. State James Buchanan, 25 November 1851, Bauer, ed., *New American State Papers*, vol. 3, 397, 399-400.

20. Ibid., 401.

21. Commodore Philip F. Voorhees to Sec. Nav. William B. Preston, 25 June 1850, ibid., 389 (Voorhees had transported Balestier on his mission, and the two soon detested one another).

22. Balestier to Buchanan, 25 November 1851, ibid., 402-3.

But there is at least one strong similarity between the first and last Vietnamese-American clashes. The United States could achieve its objectives in neither. Percival was unable to rescue Lefevre. A host of his late twentieth-century fellow-countrymen could not prevent Communist regimes from seizing power in Vietnam, Laos, and Cambodia. Commander Tyrone G. Martin, fifty-seventh in command of "Old Ironsides," and her biographer, connects the two episodes. He quotes the same lieutenant who at first had endorsed Percival's rescue attempts. John B. Dale wrote in his journal just as he left Tourane: "It seems, I must say, to have shown a sad want of 'sound discretion,' in commencing an affair of this kind, without carrying it through to a successful issue."[23] Martin's entire comment reads: "Prophetic words."[24]

23. Dale, "Journal," 25 May 1845, p. 17.

24. Tyrone G. Martin, *A Most Fortunate Ship: A Narrative History of "Old Ironsides"* (Chester, Conn., 1980), 239.

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The U.S. Light-House Board: Progress through Process

JOHN O. SANDS

THE nineteenth century saw, in America, the development of what was to become the best system of navigational aids in the world. As with many other endeavors of the period, the lighthouse service started the century with lackadaisical management and relatively primitive equipment. By the end of the century, the service was rigidly professional and technologically mature. Through judicious administration, carefully conceived and executed programs of experimentation, and a systematic exchange of knowledge with the lighthouse establishments of Europe, the United States was able to remedy what had been a national disgrace. The primary instrument of this change was the Light-House Board, a body that steadily pursued its goal of providing the best possible system of lights for the mariner, at a reasonable cost to the country. Until its reorganization in 1910, the Light-House Board was the strong hand that molded the U.S. lighthouse service into an organization commanding worldwide respect.

The provision of lighthouses by a governmental agency for the benefit and protection of mariners was not an idea new to the nineteenth century. In fact, there were a number of lights in colonial America, maintained by the individual colonies, though in many cases indifferently and intermittently. Congress early recognized the federal responsibility to provide for the safe navigation of the country's waterways, and by an act of 7 August 1789, a centralized lighthouse service was created in the Treasury Department. During the first years of its existence, the lighthouse service was managed by the president and the secretary of the treasury, but increasing size and responsibilities made the delegation of authority necessary. In 1820 the management of the lighthouse service was assigned to the fifth auditor of the treasury, Stephen Pleasonton.

Pleasonton was an administrator, far from expert in matters relating to lighthouses and navigation. His primary interest lay in seeing that the public dollar was not squandered, while attempting to provide an adequate service. During the thirty-two years of his administration, the number of lights increased dramatically, but the quality of those lights and their positioning continued to be a matter of controversy. Because of his lack of experience in the technical aspects of the field, Pleasonton was forced to rely upon advisors, most of whom were drawn from the ranks of contractors who ultimately benefited from the business of the government. Although no direct evidence of collusion has been demonstrated, the arrangement certainly resulted in the hindrance of progress that might otherwise have been expected.

The most obvious of these situations involved the lighting apparatus itself, central to the quality of the light produced. In 1822 Augustin Fresnel, a Frenchman, had invented a prismatic lens capable of concentrating the scattered rays of light produced by a lamp and directing them in a flat horizontal beam. This resulted in a much more efficient utilization of available foot candles than did the earlier parabolic reflectors. In spite of the relatively high cost of installing Fresnel lenses, they soon became the standard in French and English lighthouses of any importance. However, Pleasonton's principal advisor on lighting matters, in fact on all lighthouse matters, was a manufacturer of parabolic reflector lamps. As a result, the American service continued to use reflector lamps long after the superiority of the Fresnel lens had been demonstrated.

Congress began to suspect that the stream of complaints leveled at the American service might be justified, and therefore contemplated forcing the introduction of the Fresnel lens. For this reason, in 1840, Capt. Matthew C. Perry, later of Japanese fame, was dis-

patched to Europe to procure two of the French lenses for testing. His report stated, in part:

> A question is now presented whether the French lenticular apparatus or the improved English parabolic reflectors are to be preferred. I made it my duty to examine into the operation and effect of both of these plans, and the result of my observations, added to the best information I could obtain, decided me in favor of the French system. The brilliancy of both, however, is so remarkable, compared with the dimness of the American lights, that no one can avoid noticing the difference, although in the United States, the parabolic reflector, if such it can be called, is universally in use. The imperfection of its form and the inferiority of its construction, as to material and workmanship, are so apparent that it has always been a matter of surprise among nautical men why the evil has been so long permitted to exist, while in most other respects we have taken the lead in practical improvements.

Captain Perry saw more than a simple technological gap between the British and the American systems. Rather, he perceived a malaise that cut to the heart of the national attitude:

> It is a peculiarity of the people of this country, that a proper regard to the preservation of human life enters too little into the concerns of the every-day transactions of the community. We are constantly hearing the most melancholy disasters on board of steamers and in vessels approaching the coast, by which numerous lives are sacrificed, not so much to the inscrutable chances of ill-fortune proceeding from inevitable causes, as from the unpardonable negligence of those whose duty it should be to guard against these catastrophes. And so in regard to the care of lights which are established to guide the anxious seaman along the dangerous coast or into the distant port. How responsible is the trust of those who undertake the charge, and yet how little is the trust regarded![1]

In spite of Captain Perry's persuasive plea for professionalism, the Fresnel lens was not immediately introduced into regular use in the country.

If there is one virtue that Congress possesses above all others, it is the capacity for deliberate action. In 1845 Lieutenants Thornton A. Jenkins and Richard Bache, both of the U.S. Navy, were dispatched to undertake a further investigation of the lighthouse systems in Great Britain, Belgium, and France. Their report, published in 1846, echoed in resounding tones the vote of support that Perry had given the Fresnel system, and was equally vocal in condemning the present American system. Even so, it was not until 1851 that a full-scale investigation of the American lighthouse service was ordered, to be conducted by a board of examiners created for the purpose. Composed of both military men and civilians, this board undertook an exhaustive examination of the entire system. Its extensive report dealt with many technical aspects of the system, but the basic conclusion was that it was impossible to continue to operate the service under the present administrative structure. They recommended, and Congress established, an independent managing board, under the Treasury Department, solely concerned with lighthouse matters. In the legislation authorizing the Light-House Board, passed 9 October 1852, it was specifically ordered that Fresnel lenses be adopted in all new lighthouse structures. The board included two officers each from the navy and army, two civilian scientists, and two secretaries, one navy and one army; the secretary of the treasury served ex-officio. Only the two secretaries, one of whom was Thornton Jenkins, served full time, and only they were compensated for their services.[2]

The newly organized board went immediately to work on the problem of improving the American navigational system. In addition to implementing the suggestions that had been made by the examining board, whose members largely duplicated those of the new board, they also sought to gather comparative data on the lighthouses of other nations. For this reason, in 1855, the board dispatched a request to Great Britain, asking for "such information, documents instructions form of accounts etc. etc. as the Board of Trade of Great Britain may be pleased to communicate in relation to the present management of the Lighthouse Establishment of Great Britain."[3] The British establishment had itself recently been put under the control of the Board of Trade, in the hope of achieving some uniformity between the three administrations of England, Scotland, and Ireland. This request for information by the American Light-House Board was to become one of a long series of international contacts between the American, French, and British lighthouse establishments.

1. Matthew C. Perry, *Light-Houses of Great Britain and France*, Sen. Doc. no. 619, 26th Cong., 1st Sess. (Washington: Government Printing Office, 1840), pp. 3-4.

2. Francis R. Holland, *America's Lighthouses: Their Illustrated History Since 1716* (Brattleboro, Vermont: Stephen Greene Press, 1972). This work provides an excellent overview of the early development of the lighthouse service, and served as the basis of much of the introductory material in this paper.

3. U.S. National Archives, Record Group 26, Records of the Light-House Board, Journals of Meetings, vol. 2, fol. 233. Hereafter U.S.L.H.B. Journals.

More than any other single person, Joseph Henry must be credited with professionalizing the U.S. lighthouse service. He served on the Light-House Board from its founding in 1852 until his death in 1878, the year this portrait was executed by Henry Ulke. (Photograph courtesy of National Archives, U.S. Coast Guard Collection.)

The exchange of technical reports across the Atlantic came to be almost routine.

In 1858, the U.S. Light-House Board sent a report of its activities to Great Britain, requesting in return copies of similar reports exchanged by the British and the French.[4] Later, a major inquiry into the condition of British lights was ordered by Parliament, and the report, submitted in 1861, was made available in this country. It contained not only a full inquiry into the status of the Lighthouse Establishment of Great Britain, but also a detailed comparison with that of France, the model of excellence during the nineteenth century. This report was considered sufficiently important by the U.S. Board that an abridged version was printed in this country, though not until 1871.[5] The early 1870s saw the American publication of several works on lighthouses. Among these was the *Memoir* of Leonce Reynaud, originally published in French in 1864; two chapters were translated and published in 1871, and almost the entire work was brought out in 1876. Written by the head of the French lighthouse service, the *Memoir* was a complete report on the French system, including methods of construction, the types of lights employed, and the technical advances that had been made.[6] Through such exchanges of information, the various lighthouse establishments of the major maritime nations were able to stay abreast of developments elsewhere.

The improvement effected in the U.S. lighthouse service was dramatic. From the mismanaged and antiquated establishment they had inherited in 1852, the Light-House Board had molded a service of which they could write in 1870:

> The light-houses, and light-vessels, (so far as the exhibition of efficient lights is concerned,) are, it is believed, equal to any in the world, and those beacons and buoys actually in position are efficient day-marks to guide clear of the obstructions for which they were established.[7]

That the service had been vastly improved is unquestionable; that this had been accomplished by a board composed largely of volunteers is truly remarkable. Such a vigorous program of self-reform in such a brief period has few parallels.

Joseph Henry and the Committee on Experiments

None of the lighthouse services was content to simply absorb the information made available by other countries; in fact, all of them remained strangely distrustful of studies conducted elsewhere. The result was that in what was outwardly a world community of scientists, each benefiting from the work of the others, there was a surprising duplication of effort in even the most routine

4. The American report of 1858 was produced in response to a Senate resolution, and was later published in U.S. Light-House Board, *Papers on the Comparative Merits of the Catoptric and Dioptric or Catadioptric Systems of Light-House Illumination and other Subjects relating to Aids to Navigation* (Washington: Government Printing Office, 1861), pp. 252-71.

5. U.S. Light-House Board, *Extracts From the Report of Her Britannic Majesty's Commissioners, Appointed to Inquire into The Condition and Management of Lights, Buoys and Beacons. Submitted March 5, 1861, and Presented to Both Houses of Parliament By Command of Her Majesty* (Washington: Government Printing Office, 1871).

6. Leonce Reynaud, *Memoir upon the Illumination and Beaconage of the Coasts of France*, trans. by Maj. Peter C. Haines (Washington: Government Printing Office, 1876).

7. U.S. Light-House Board, *Annual Report* (Washington: Government Printing Office, 1870). Hereafter U.S.L.H.B. *Annual Report*.

experiments. From its inception, the U.S. Light-House Board had included two civilians of "high scientific attainment." One of these was to head the standing Committee on Experiments, which would:

> when required, test the value of oils and other illuminating materials and accessories, and of lighting apparatus; investigate the relative value of signals by sound or sight; the ventilation of light-houses and light vessels, and their protection from lightning; the modes of preventing corrosion or decay of materials used in the light house service; and make experiments or observations to determine the value, application, or economy in all other matters which the Board, from time to time, may require.[8]

When the members of the Light-House Board were appointed in 1852, the only significant change from the earlier examining board was the addition of Prof. Joseph Henry as one of the civilian scientists.

One of the most renowned physical scientists of his day, Henry had been a professor at Princeton until the founding of the Smithsonian Institution, of which he became the first secretary in 1846. He had until that time been deeply involved in research into electricity, especially electromagnetism. He appears to have independently discovered the principle of the induced current, a principle announced by Michael Faraday in 1831. Although he acknowledged Faraday's priority, the modern unit of induction is called the henry in recognition of his contribution. As secretary of the Smithsonian, Henry had less time to devote to his own research, but he continued to be vitally interested in scientific development. It was his feeling that the Smithsonian should devote itself primarily to the support of scientific research, rather than the maintenance of a library or museum facility. It is not clear what motivated the choice of Henry for the Light-House Board, but it is possible that his association with Faraday was a factor. That eminent scientist had served for many years as advisor to Trinity House, the English lighthouse establishment. Further, Henry was a close personal friend of Alexander Dallas Bache, of the Coast Survey, who was the other scientist on the board. In any event, it proved a wise choice.

Although the Committee on Experiments was often requested to test some invention sent to the board for its examination, this was not its most significant activity. Henry was soon able to establish what amounted to a systematic research program in certain areas. The first series of experiments was let out on a contract basis to an independent investigator, J. H. Alexander, of the University of Maryland. He undertook studies of the various fuels available for use in lamps, in search of the one most suitable for widespread adoption. He also attempted to develop a reliable field method whereby the composition and quality of the oil could be determined.

Submitting three reports between June 1855 and January 1856, Alexander outlined a system for the analysis of oils and reported on the use of various oils as fuels. Though the service had previously used sperm oil, its decreasing availability and rising price made it imperative that a substitute be found. They determined to follow the lead of the French establishment and use rape-seed oil, called colza, once it had been tested by Alexander. Unfortunately, the farmers of America could not be persuaded to grow the plant in sufficient quantity, and the board was forced to return to whale oil.

Alexander also undertook experiments on a system for distinguishing between lighthouses, originally developed by Charles Babbage, and more importantly, on steam-operated fog signals. Concerned with finding a practical method for making the most noise for the least possible cost, Alexander tested several devices. He did not make the progress that he had anticipated, due to the fact that he was working in the heart of Baltimore:

> Experiments like these would already have been tried, under the authority presumed from your general instructions, except for the inconveniences of circumstances. . . . As it was, our experiments at the works were disturbed, and I confess, not without reason, by the interference of the municipal police. The disturbances, to be sure, did not amount to anything; for, in anticipation of some such consequence from the fearful noises accompanying the experiments, they were so programmatized as to allow, at various intervals, of a cessation, and thus to manifest all becoming respect to the authorities.[9]

One can but imagine the interchange. This was not the last time the Light-House Board would find the public less than enchanted by the use of fog signals in urban areas.

Apparently, Henry's continuing involvement with the activities of the board stirred his interest in the research possibilities it represented. Consequently, when the

8. U.S. Light-House Board, *Laws and Regulations Relating to the Light-House and Light-Vessel Keepers of the United States* (Washington: Government Printing Office, 1880), p. 37.

9. John Henry Alexander, "Report on Fog-Signals by Steam," *Experiments on Mr. Babbage's Method of Distinguishing Light-Houses, Reported to a Committee of the United States Light-House Board* (Washington: Government Printing Office, 1861), p. 116.

failure to introduce colza oil into the service reopened the question of a cheap and practical illuminant, Henry himself undertook a series of experiments. As a result of this work, the board began to use lard oil in all of its large lamps after 1867, a change that led to considerable economy of operation.[10] Another series of experiments conducted by Henry led to a recommendation in 1875 for the gradual adoption of mineral oil, or kerosene, because of its cheapness. This change took a number of years to institute, as it also required the use of a new lamp.[11]

Of considerably more personal interest to Henry was the study of fog signals that he took up following Alexander's abortive efforts. In 1865 Henry began a lengthy examination of various instruments, including whistles, bells, gongs, trumpets, and sirens. Although appointed chairman of the Light-House Board in 1871, Henry continued to serve in his capacity as head of the Committee on Experiments. He persevered with his work on fog signals, and tests to determine the relative efficiencies of the devices were performed in 1873 and 1874. Henry gradually became less interested in the mechanical devices themselves than in the scientific phenomenon of sound itself. His studies turned to the mechanics of sound, its transmission over water, and a peculiar effect that resulted in null zones at certain points. In his studies of 1876 and 1877, he was increasingly concerned with the study of these "aerial echoes," and continued to submit extensive reports on his work.[12]

Interest in Henry's experiments, especially those with fog signals, was high on the other side of the Atlantic. Trinity House sent a delegation to this country to observe the experiments and gather as much information as possible on the operation of the signals. In return, an invitation was tendered to the Light-House Board, offering to open the British lighthouses for inspection by an American. For this purpose, the engineering secretary of the Light-House Board, Maj. George Elliot, was chosen. He was directed to:

> particularly investigate the value of English made Lenses, as compared with the French, also, the advisability of special Lenses for great elevations, and will if the investigation should make it advisable, order one English and one French lens, for testing the use of such lenses in this country.[13]

Elliot spent most of the spring and summer of 1873 in Europe, and visited not only the British lights, but also those of the French and the Austrians. He submitted an exhaustive report to the Light-House Board, which saw it immediately published.

Elliot's principal concern was with the improvements of the lighting apparatus that the British and the French had effected:

> Within the last five or six years improvements have been made from time to time in lenticular apparatus, but they are of trifling importance when contrasted with the great increase of power and concurrent decrease of expense of sea coast lights as compared with the system in use in Europe a few years ago, and with ours of the present time.
>
> These vast ameliorations have been produced by:
>
> 1st. The introduction of mineral oil for light-house illuminants.
>
> 2d. The improvements in 'burners' for lamps, resulting from experiments made to determine the best form of lamps for burning mineral oil in light-houses, which improvements apply equally to lamps burning oil of a mineral, animal, or vegetable origin.[14]

Elliot outlined in some detail the procedures used for employing mineral oil and described the improved lamps. He further reported at considerable length on the use of electric and gas lights, recommending that they be adopted for those situations where a high-powered and reliable lamp was vital. He advised the immediate adoption of mineral oil in U.S. lights, a recommendation that was approved, but only after Henry had undertaken an elaborate series of confirming experiments.

This duplication of experiments was not a phenomenon limited to the Light-House Board. Elliot reported an extensive series of tests being conducted by Professor Faraday's replacement as scientific advisor to Trinity House, Prof. John Tyndall. Having sent a delegation to observe the U.S. tests on fog-signals, the British determined to pursue the same study themselves. Armed with Henry's procedures, and even with several American devices, they attempted to test the comparative efficiencies of the various units. The methods employed,

10. U.S.L.H.B., *Annual Report* (1874), p. 10.

11. U.S.L.H.B., *Annual Report* (1875), pp. 86-103; *Annual Report* (1877), p. 5.

12. U.S.L.H.B., *Annual Reports* of 1874, 1875, and 1877 all contain reports.

13. U.S.L.H.B. Journals, vol. 5, fol. 200.

14. George H. Elliot, *Report of a Tour of Inspection of European Light-House Establishments, Made in 1873*, Sen. Exec. Doc. no. 54, 43rd Cong., 1st Sess. (Washington: Government Printing Office, 1874), p. 19.

and the results achieved, as reported by Elliot, were decidedly inferior to Henry's work.[15]

Faced with this seemingly wasteful duplication of effort, it is fair to ask whether the free and open transfer of knowledge that appears to have prevailed during this period actually had a major effect on the actual state of the art in any individual country. Certainly, in the U.S., it did not reduce the expense of carrying on experiments, repetitive or not. By 1879, of a budget of just over $3 million, $50,000 were allocated to the Committee on Experiments for "Experiments with Illuminants."[16]

There is little doubt that Henry came to find these experiments personally rewarding in themselves, over and above any value they may have had for the improvement of the lighthouse service. Certainly, he devoted a very considerable amount of his time and energy to this work, especially in view of his deteriorating personal health. In refusing an invitation to visit Rochester, New York, in August of 1876, he wrote:

> When your letter was received I was in the midst of my duties as one of the judges of the centennial and so affected by the heat that I was obliged to defer my decision as to the meeting until I [might] ascertain the state of my health at the time I should be required to start. When my duties were ended I found myself so [reduced] in strength by an affliction of the bowels that I was obliged to stay in the country near Philadelphia for about a week in a state of intense inactivity. At the end of that time I came to this place [New London, Connecticut] and was so much improved in health that I concluded I would start for Buffalo in time to give you the promised visit at Rochester. The intervening days to be devoted to research on sound in connection with fog signals. I have been actively engaged in these researches, but unfortunately the setting in of another heated term has induced me, very reluctantly, to comply with the solicitations of my family to give up going to Buffalo and to postpone my visit to Rochester until the cooler temperature of the autumn.
>
> I know it is more important that we should live well than that we should live long but I think it a duty which I owe my family myself and my country that I should keep my lamp alive as long as it is capable of radiating any light which may be of importance and therefore I must cherish the flame and be careful not to expose it to any rude blast. I have spent all my vacations for several summers on the seacoast among the Light-Houses and this although I have been constantly hard at work has given me strength, efficiently to discharge the duties of the Institution during the other parts of the years.[17]

Joseph Henry died on 13 May 1878, still serving as chairman of the Light-House Board and secretary of the Smithsonian Institution.

Henry's involvement with the theoretical aspects of the experiments can only be fully appreciated when his work is compared to that of his successor as head of the Committee on Experiments, Henry Morton, of the Stevens Institute of Technology. The first report that Morton submitted, in 1879, dealt with electric light. While he gave a very complete and competent report, his interest lay in collecting the work of others and considering the practical applications of these devices to the lighthouse field. He was less the theoretical scientist, and the studies of the board were henceforth confined to the relatively mundane and technical.[18]

It may reasonably be asked what it was that motivated a man like Henry to devote such a large amount of his time and thought to the Light-House Board, a position for which he received no remuneration and little recognition outside the professional circle. It is the more surprising when the involvement of Professor Faraday with Trinity House is considered. Although he was paid for his work, the examining board of 1861 noted that adequate use was not being made of his services, and hoped that he would become more involved in studies of the lighthouse establishment.[19] It can only be assumed that it was precisely because he was able to pursue those tangential avenues of inquiry that happened to interest him that Henry was willing to devote so much of his attention to the lighthouse service.

The influence Henry exerted on the Light-House Board is unmistakable; rigorously applying scientific methods himself, he demanded the same level of professionalism from the rest of the service. It was this very professionalism that was to become the hallmark of the U.S. Lighthouse Service.

Lighthouses on Parade: The Centennial Exhibition

During the summer of 1876 the United States celebrated its centennial anniversary with a major exhibition in Philadelphia. Privately sponsored, it included exhibits from across the United States and around the world. Because it was such an important national event, it was extraordinarily well documented. As a stop-

15. Ibid., pp. 22-66.

16. U.S.L.H.B., *Annual Report* (1879).

17. University of Rochester, Rush Rhees Library, Joseph Henry to Lewis H. Morgan, 16 August 1876; copy in the Smithsonian Institution, Papers of Joseph Henry, no. 5099.

18. U.S.L.H.B., *Annual Report* (1880).

19. U.S.H.L.B., *Extracts From the Report of Her Britannic Majesty's . . .*, p. 52.

The grounds of the Centennial Exhibition offered many enticing prospects for the visitor in 1876. The large structure behind the lake. with the flag on its cupola, is the Government Building. Outside, to the right, is the temporarily erected lighthouse: in front of the lake is the torch from the Statue of Liberty. (Photograph by the Centennial Photographic Company. courtesy of the Philadelphia Free Library.)

action picture. it provides both a gauge of the overall national temperament and a relatively clear and accurate picture of the situation in 1876 of each of the exhibitors. The image they chose to project, the material they chose to exhibit. and their public reception all reflect the status of the exhibitors. whether private or public. The participation of the U.S. government in its own birthday celebration was expected. and among the government exhibits was one contributed by the Light-House Board.

In January 1874. the president created a board to coordinate the activities of the federal government at the centennial. When this board met for the first time in April 1874, it included not only its chairman, Col. Stephen C. Lyford of the War Department, but also representatives from the Interior Department, the U.S. Post Office, the Department of Agriculture, and the Smithsonian Institution. Lyford had already recommended a year before that a separate building for the display of the military hardware of the United States be established. No action had been taken, however, and no specific provisions were made in the executive order.

When the board finally went to Philadelphia to examine the site, it was already November 1874, and no concrete plans had been formulated for housing the government exhibit.[20]

The cold reality of the wide open spaces of Fairmount Park apparently sparked prompt action, and potential exhibitors were soon contacted. The Journal of the Light-House Board records on 18 November 1874:

> The Naval Secretary presented a letter from the first Comptroller of the Treasury, dated Nov. 10th, enclosing a letter from Col. Lyford, Chairman of the Centennial Board, in regard to the quantity and character of space required by the Light-House Board at the Centennial Exhibition to be held in Philadelphia in 1876. Referred to the two Secretaries for answer.[21]

This request for information had come to the board through the Honorable R. W. Tayler, who was first comptroller of the treasury and responsible for the centennial exhibits of the various treasury departments, including the Light-House Board. If Lyford's board had finally realized the immediacy and scope of the problem that faced the executive departments, the same cannot be said of the Light-House Board. The question was referred to the board's only full-time staff, and their reply was perfunctory at best. The naval secretary wrote on 28 November that "the Board would be glad to have a paralelogram about 50 x 20 feet, in which, to place such apparatus as may be thought desirable."[22]

While Colonel Lyford and his committee lobbied Congress for appropriations, no action was taken on the lighthouse display. Though Lyford was unable to persuade Congress to appropriate funds for the construction of a separate building, he was able to divert some funds from those granted for the purpose of gathering displays from the various departments. With this $150,000, construction began on an independent Government Building designed by James H. Windrim, a Philadelphia architect. Because of the extreme financial shortage, the architect was forced to forego much of the superficial ornamentation in which he might otherwise have indulged. The result was a cross-shaped wooden building, of a not displeasing simplicity; at the intersection of the cross was a cupola drum. The structure, well suited to its task of housing a wide variety of display materials, was completed in February 1876.[23]

During the extended hearings that Congress held concerning appropriations for the participation of the government in the centennial, the Light-House Board finally recognized its opportunity and began to prepare. It was apparent from the start that a minor exhibit such as had been sent to Vienna in 1873 would be inadequate. A small collection of photographs and publications would hardly be suitable for this major event in American history.[24] Nor could the board expect to repeat the interesting but inconsequential exhibit that had been placed in the New York Crystal Palace Exhibition. Two Fresnel lenses, even though one of them was of the first (and largest) order, would hardly suffice.[25] Not only had the lighthouse establishment itself grown during the succeeding two decades, but public interest in things mechanical had blossomed as well.

Therefore, the board resolved on 21 April 1875:

> On motion of Capt. Davis, it was- Resolved, that a Committee of three, consisting of the Chairman and the two Secretaries of the Board, take into its consideration, and report how the Light-House Board and its operations should be represented at the Centennial Exposition, to be held in 1876, at Philadelphia.
>
> On motion of Capt. Davis, it was further- Resolved, that the Light-House Establishment send to the Centennial Exposition to be held in Philadelphia, in 1876, specimens of the oldest lamps, reflectors, etc., used in the country; specimens of the lamps, illuminating apparatus, etc., now in use; and such other apparatus, models, and drawings, as will best indicate the advance made by this country in Light-House affairs during the last century.[26]

Though one might have questioned the wisdom of placing this added responsibility on Joseph Henry, already burdened with other duties, at least some positive and concerted action had been taken. Obviously, Captain Davis was concerned that the exhibit might be put aside in the press of the chairman's other business, and therefore sought to establish a general philosophy. There was little doubt, in any event, that the advances of the last century had all taken place during the last quarter century, since the advent of the Light-House Board.

20. H. Craig Miner, "The United States Government Building at the Centennial Exhibition, 1874-1877," *Prologue* (Winter 1972), p. 204.

21. U.S.L.H.B., Journals, vol. 6, fol. 295.

22. U.S. National Archives, Record Group 56, Exposition Records, R. W. Tayler Correspondence Received, 28 November 1874. Hereafter Tayler Correspondence.

23. Miner, "Government Building," pp. 204-7.

24. U.S.L.H.B. Journals, vol. 5, fol. 213. Elliot, *Report*, p. 266.

25. Goodrich, Charles R. and Silliman, Benjamin, ed., *The Illustrated Weekly Record of the New York Exhibition of the industry of all nations* (New York: G. P. Putnam, 1853).

26. U.S.L.H.B. Journals, vol. 6, fols. 490, 491.

The outdoor display of the Light-House Board included not only a cast-iron lighthouse but also, to the right, the infamous steam-operated fog signals, the Stevens fog bell, and a set of parabolic reflector lamps. (Photograph by the Centennial Photographic Company, courtesy of the Department of Cultural History, Smithsonian Institution.)

It was not until September of 1875 that the Light-House Board was formally requested to submit a budget for its display within the Government Building. To formulate a realistic cost estimate, the board had to come to some conclusion as to the exact contents of its exhibit. The engineer secretary replied that $6,000 would be sufficient to exhibit not only various engineering models and drawings, views of structures then in use, and other small miscellany, but also:

> Specimens of each kind and order of lenses in use for the illumination of light-houses, with some old reflectors which were formerly used will be presented. These will exhibit the progress that has been made in the subject of illuminating light-houses.
>
> Specimens of all kinds of material and implements employed in light house illumination, all kinds of lamps, wicks, chimneys, &c., will be sent. It is proposed to have one lens of the first order, flashing at intervals of ten seconds, in operation a large part of the time. This should be exhibited in some prominent place, as it will be an object of marked interest. A specimen of the most approved fog-signal, called, by us, the siren will also be exhibited. This should be operated at certain times to show its powers. For this purpose it should be set up outside of the main building.[27]

The board was sensitive to the fact that what it had to display, particularly the models and drawings, was not the stuff of great drama. It was more than willing to capitalize on those few items in its arsenal that would have some major impact. Though Professor Henry had a personal interest in the fog siren, as a result of his experiments leading to its development, he must have been conscious of its audiovisual effect, especially in combination with a flashing light.

The first comptroller may have been somewhat taken aback by the inclusion of this rather bizarre material in what he had assumed would be a relatively simple and static exhibit. However, he was willing to try anything that might give life to the treasury section, up against some stiff competition from the military and the Smithsonian. He therefore wrote to the Light-House Board and requested further details on the apparatus. The engineer secretary replied with the suggestion that the lens could best be placed at the crossing of the two aisles, where it would be visible from the entire building. Should this space be taken, it could be placed "on the section allotted to the Treasury Department," a circular space twenty feet in diameter seeming adequate. As to the fog signal, it "should be placed outside of the building, as it will have a steam engine, and will make a great noise. A temporary shed is all that will be required for it."[28]

At the same time that this letter was being written, another suggestion was forthcoming. Adm. Thornton A. Jenkins was the navy representative on Colonel Lyford's centennial board, but he had some years before served as naval secretary to the Light-House Board. He was therefore knowledgeable concerning lighthouses, and proposed that the Fresnel lens might be accommodated in the cupola of the Government Building, thus relieving the tedium of the building and giving maximum play to the light. The engineer secretary replied on behalf of the board that the problems of maintenance in this inaccessible location were considerable, but even

27. Tayler Correspondence, 10 September 1875.
28. Ibid., 17 September 1875.

more disturbing was the loss of visual impact that would be incurred. As the lens could not rotate, it would not flash, and the lightbeams concentrated by the prismatic lens would shine out over the heads of the visitors, being most visible not in Fairmount Park but Bala-Cynwyd.[29]

This project was abandoned, but the interest and enthusiasm of the Light-House Board had finally been sparked. On 23 September 1875, the engineer secretary wrote to Tayler to inform him that the board had decided to mount a larger exhibit than originally planned. They had decided to display full-size floating aids to navigation, especially buoys, rather than mere models. This necessitated an increase in allotted space to three thousand square feet, and an appropriation of $15,000. As the Light-House Board saw its role in the centennial beginning to develop, it decided that someone should be placed in charge of activities there. Therefore, on 29 September 1875, Capt. J. L. Davis, who had earlier expressed such interest in the project, was given the task.[30]

Evidently, the Light-House Board was not the only section of the Treasury Department with expansionist tendencies, and the first comptroller was fast discovering that the appropriated funds were woefully inadequate. He therefore petitioned Colonel Lyford on 1 November 1875, requesting that his budget be increased from $5,000 to $44,000, a sum that included the request of the Light-House Board for $15,000. No action seems to have been taken, and Tayler again wrote on 25 March 1876, requesting additional funds. He reported that:

> The materials on hand are abundant for an exhibition that would redound to our advantage and honor.
>
> The Light-House Board has models of light-houses and towers, and has lens, fog-signals, &c., equal to those used by other nations; our coast, served with lights, is more extensive, and the various articles, instruments, &c., on hand would enable the board to make a gratifying display, if sufficient funds were supplied.[31]

In spite of these appeals, Colonel Lyford was apparently unable to grant the full request for funds; his budget was severely strained as a result of having financed the building out of the exhibition appropriation. However, the funding for the Light-House Board was finally increased to $6,000; any expenditure above that figure had to be made up out of the board's own budget.[32]

Although the size of the appropriation was not settled until April 1876, the Light-House Board had gone ahead with its preparations. Theirs was the boundless faith of the bureaucrat that the budget can always be stretched, that funds are bound to materialize from somewhere. Far from intimidated by the small appropriation, the board seems to have ignored the situation entirely. Very soon after Captain Davis was appointed to handle the preparations for the centennial, the board dropped its biggest bombshell.

Colonel Lyford had finally come to grips with the question of the lens and the fog siren by September 1875, but he was far behind the Light-House Board, as he soon came to realize. In a letter of 18 November 1875, he informed Tayler that he had "incidentally learned that it is the intention of the Light House Board to erect a Light House Structure upon the Government grounds at the Exhibition." He wanted to know whether this was, in fact, the case, and if so, how much space would be required.[33]

The rumor Lyford had heard was correct; the Light-House Board was seriously considering the erection of a full-size lighthouse on the exhibition grounds. In a letter of 19 November 1875, Joseph Henry wrote:

> In behalf of the Light House Board of the United States, I write to ask whether the space at the intersection of Belmont Avenue and the avenue running through Horticultural Hall in front of the Government building, may be assigned to the Board for the erection of a screw pile light house, having a height of focal plane of 105 feet if the structure can be furnished in time, if not, a tower of 60 feet in height; from either of which lights will be nightly exhibited which will serve to illuminate a considerable portion of the grounds.
>
> Besides exhibiting a structure intended for Florida reef, the tower will be ornamental and elicit prominent interest, especially in visitors from the interior of the country.[34]

Hardened by now to anything, Colonel Lyford requested further details.

The screw pile lighthouse that Henry referred to in his letter was apparently intended for Fowey Rocks, to replace the Cape Florida Light. The Cape Florida tower had the singular distinction of having been besieged by

29. Ibid., 18 September 1875; 24 September 1875.

30. Ibid., 23 September 1875. U.S.L.H.B. Journals, vol. 6, fol. 597.

31. "Additional Appropriation for the Executive Departments of the United States at the Centennial Exhibition," House of Representatives Exec. Doc. no. 148, 44th Cong., 1st Sess. (Washington: Government Printing Office, 1876), p. 17.

32. Tayler Correspondence, 29 July 1876.

33. Ibid., 18 November 1875.

34. Ibid., 19 November 1875.

the Seminole Indians in 1836, resulting in considerable damage to both the structure and the assistant keeper. Moreover, the tower had been improperly constructed when it was first erected around 1825; the walls, supposed to have been solid brick five feet thick, were hollow. After continued difficulty with the light, it was decided to replace it with an iron tower offshore, on Fowey Rocks. The tower as built was a skeletal iron framework, with the keeper's dwelling suspended in the center; the focal plane of the light was 110 feet above low water.[35]

Surviving plans indicate that the structure was built with driven piles rather than screw piles, but this modification could have been made at any time before construction actually started. The structure is of particular interest because of its design. Built of iron members, the lighthouse could be completely prefabricated and then erected on the site. This was a system employed by the French for towers to be placed in remote areas, and was well adapted to American geography. One need only compare this structure with the standard wooden screw pile lighthouse erected during this period in the Chesapeake Bay area to discover the substantial advantages gained from this mode of construction. The date of establishment for the light at Fowey Rocks is usually given as 15 June 1878, and it must be presumed that the tower was not completed in time to be exhibited at the centennial. Had it been, it would have made an impressive exhibit.

The fact that the Fowey Rocks tower could not be exhibited did not discourage the Light-House Board, which had apparently been aware of this possibility from the beginning. Another light under construction was chosen. Located at the entrance to New Haven harbor, in Connecticut, the South West Ledge light was another example of prefabrication, though on a somewhat smaller scale. The structure consisted of an iron caisson built onto a rock ledge about twelve feet below the water's surface. The caisson was filled with concrete and surrounded with riprap, resulting in a monolithic base well protected against ice movement. On this foundation, a combination dwelling and light could be erected, also built of cast iron. Though of interest because of its prefabrication, this type of structure was of particular importance because of its tubular foundation, which was highly resistant to the pressures of ice floes, a constant hazard in offshore stations.[36]

In addition to the lighthouse structure, the board was still actively engaged in gathering materials to be exhibited inside the Government Building. As often happens, several private individuals attempted to utilize the government exhibition to promote their own products. On 28 March 1876, the Light-House Board considered a letter from John R. Wigham, of Dublin, Ireland, concerning the possibility of displaying his invention, the "triform gas-light." Captain Davis replied that the board "had determined to exhibit nothing at the Centennial not used by the Light House Establishment."[37] Mr. Wigham, an independent Irish inventor, had persuaded the Irish Lighthouse Establishment to adopt his device, but had been unable to convince Trinity House to use it. Numerous experiments were undertaken to determine its effectiveness as compared with the lamps then in use, resulting in widespread controversy. John Tyndall, then scientific advisor to Trinity House, came to believe in the device, and recommended it for use in England's lights. However, the issue became confused with the debate over the Irish question as a whole, and the dispute continued until 1881, when Tyndall resigned his post. The American Light-House Board was aware of this complicated and difficult situation, and wisely decided not to become involved.[38]

Somewhat less controversial, but still a problem to the board, was the fog-bell manufactured by George M. Stevens & Co., of Boston. On 28 March 1876, Stevens wrote to R. W. Tayler:

> Some time ago we were offered space in the centennial by the Light House Board through Capt. Davis for the exhibition of our fog-bell striking apparatus. In accordance with the offer, we have made preparation to exhibit this machine and a bell of 3000 lbs. We now have a letter from the Clerk of the L.H. Board saying they have had no space alloted to them as yet and advising us to apply to the Centennial Committee- Applying at Philadelphia we are referred to you. We have been at a considerable expense to get our apparatus ready and have been assured of a space until this last moment. Can you let us have the space- We need only about 10 feet (ten) square. The apparatus has been extensively used by the L.H. Board and is

35. Holland, *America's Lighthouses*, pp. 134-39.

36. Arnold B. Johnson, *The Modern Light-House Service* (Washington: Government Printing Office, 1890), pp. 38, 39.

37. U.S.H.L.B. Journals, vol. 7, fols. 147, 175.

38. Roy M. MacLeod, "Science and Government in Victorian England: Lighthouse Illumination and the Board of Trade, 1866-1886." *Isis*, LX, 1 (Spring 1969), 4-38.

for fog-bell purposes only. We shall of course be somewhat disappointed if our arrangements fall through as we had no idea of exhibiting until we received a communication from the Board saying they should be glad to have us exhibit. We shall be glad to hear from you in regard to the matter.[39]

If Stevens had been correctly informed, the Light-House Board had as yet been allocated no space in an exhibit due to open on 10 May 1876, less than two months away. It seems distinctly possible that Tayler delayed as long as possible the installation of the Treasury Department displays in an effort to extract a larger appropriation from Lyford. If so, he was unsuccessful. Lyford wrote on 24 April to inform him that none of the Treasury Department material had been installed, and that should the space still be empty on 5 May, it might prove necessary to reassign the area to other exhibitors.[40] This dashed any hopes for an increased budget, and the exhibits of the Treasury Department and the Light-House Board were installed in the Government Building in time for the opening.

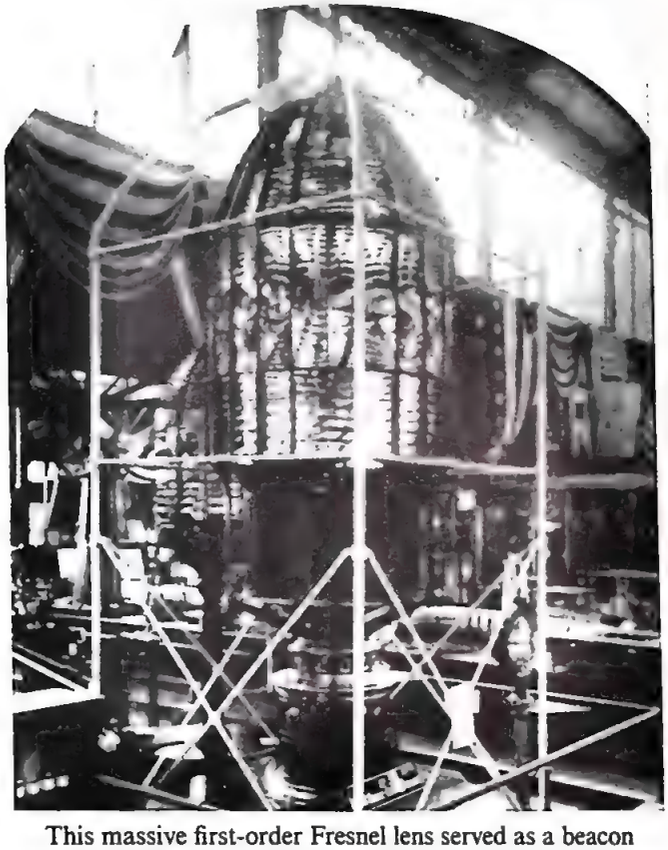
The exhibit staged by the Light-House Board certainly had difficult and strong competition. In a fair dominated by exotica from across the country and around the world, such a prosaic subject was at an automatic disadvantage. In the field of mechanical engineering, symbolized by the great Corliss Engine, a more efficient oil lamp seemed trifling at best. The Government Building itself was a huge structure, dominated by massive displays of military might, filled beyond capacity with artifacts and specimens of every conceivable description. In a building containing over 100,000 square feet, how could a space of only 30 by 40 feet ever amount to anything? The board was further handicapped by its very small budget; with only $6,000 to spend, there was little room for showmanship:

Peculiar difficulties were encountered by the Light-House Board in preparing its exhibit. The funds allowed for the purpose were only sufficient to meet the necessary expenses of the transportation and arrangement of articles exhibited. Nothing could be allowed for the preparation of new models of existing works or for the purchase of any articles. Nothing was shown, therefore, but apparatus, articles taken from the stock on hand, and models which had been constructed for the actual use of the Board.[41]

39. Tayler Correspondence, 28 March 1876.

40. Ibid., 24 April 1876.

41. Board on Behalf of United States Executive Departments at the International Exhibition, Held at Philadelphia, 1876, *Report*, House of Representatives Misc. Doc. 20, Part 2, 47th Cong., 2nd Sess. (Washington: Government Printing Office, 1883), p. 98.



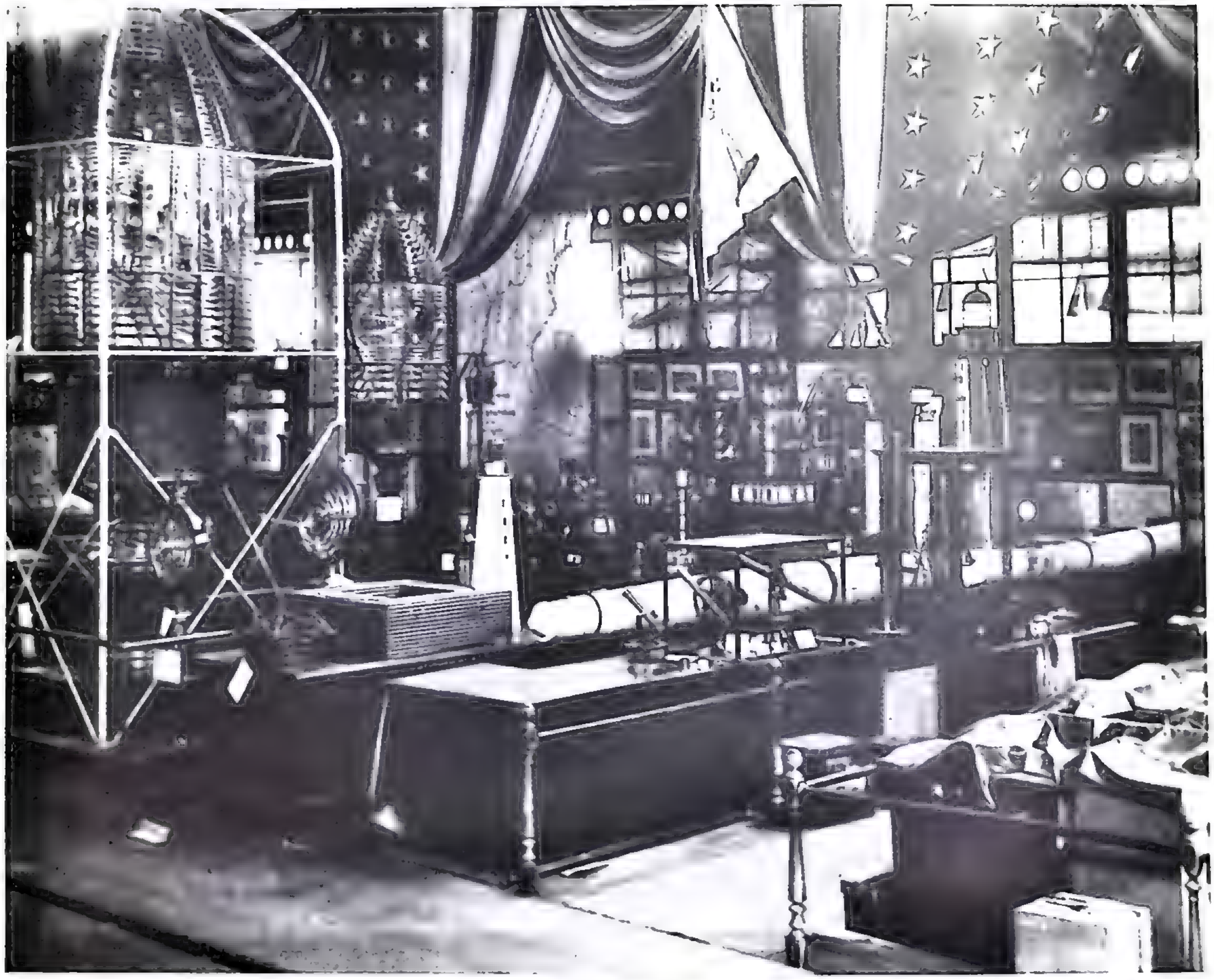
This massive first-order Fresnel lens served as a beacon drawing visitors to the display of the U.S. Light-House Board in the Government Building. Unfortunately, it was not set up to revolve as called for in the original exhibit design. (Photograph by the Centennial Photographic Company, courtesy of the Department of Cultural History, Smithsonian Institution.)

Operating under these severe limitations, the lighthouse exhibit ran a high risk of total failure.

This was not for lack of effort on the part of the Light-House Board, however. They were more than willing to use their most attractive artifacts as drawing cards for the remainder of the exhibit. One could hardly pass by the area without noticing the lighted first-order lens:

Here is a large rotary lantern, one of the most striking objects to be seen within the building. This beautiful piece of workmanship stands over fifteen feet from the floor, and is covered with prisms which gleam like the fabled gems of the Orient. But these pretty pieces of crystal are not placed in the lantern for ornament. . . . The effect is, of course, to give forth a gleam which no sailor near a dangerous coast could fail to see, and which, warning him in time, must be often blessed as the halo above the forehead of a guardian angel.[42]

42. James D. McCabe, *The Illustrated History of the Centennial Exhibition* (Philadelphia: National Publishing Co., 1876), p. 566.



The display of the U.S. Light-House Board was dominated by Fresnel lenses from the largest size down to the small but innovative range lights. Behind the spar buoys lying on their sides can be seen several models of skeletal iron towers. On the back wall is a map of lights throughout the U.S., and pictures of important lighthouses. (Photograph by the Centennial Photographic Co., courtesy of National Archives, U.S. War Department General Staff Collection.)

Because of the limited space available, the lens apparently did not revolve as originally planned. Immediately behind the large lens was a series of smaller lenses that served to draw the visitor into the display area, though none of them was lighted.

A new concept was represented by the two range lights located next to the first-order lens. Placed in pairs on a river channel, they make it possible to stay in the channel by keeping the two lights aligned. The lenses are so formed that the light, instead of being concentrated into a flat sheet, is formed into a narrow beam that can be accurately matched with its mate. Though commonplace today, these lights were only beginning to be installed on the Delaware River at the time of the centennial, and represented a major advance in river navigation. Although the most attractive and popular part of the exhibit, the lenses had, in reality, little to do with American accomplishments in the field. Lighthouse lenses continued to be imported from France and England throughout the nineteenth century.

More representative of American developments were lamps and engineering structures. Among the dozen lamps shown, representing those used over the past twenty-five years, the bulk of the early models were of

European design. However, the most common lamp in the U.S. service at the time of the centennial was one designed by Joseph Funck, the chief lampist stationed at the Staten Island Depot. Its flow regulated by a float valve, this lamp was considerably more economical of fuel than its predecessors. Several of the burners of the lamps, holding the actual wicks, were equipped with full-size photographs of the flame produced, to enable a comparison of the power of the various sizes of lamp.

The presentation of the engineering structures, as shown in models and drawings, concentrated principally on "light-houses of peculiar or difficult construction."[43] Although several masonry structures were illustrated, it was not in these that the strength of American ingenuity was demonstrated. The British were past masters at engineering marvels such as Eddystone and Bell Rock Lights, both built where no manmade structure should ever have been, and built for the ages. Two models represented the only towers of this type to have been built in the U.S., Minots Ledge near Boston and Spectacle Reef in Lake Huron, both special problems.

The American lighthouse service was faced less often with overwhelming forces of nature than with treacherous shifting sands, less with a need for beauty and permanence than with a need for an immediate solution. The scope of the American problem could best be realized by looking at the map hanging on the wall at the back of the exhibit. Produced especially for the centennial by Charles E. Gorham, of Philadelphia, the chart illustrated the position of each of the 832 lights maintained in 1876 by the Light-House Board.[44] This number was considerably in excess of that maintained by either France or England, and explains the need for an economical structure. The answer lay in a prefabricated iron frame that would provide a high, strong, and cheap tower in a minimum of time. Such a structure was certainly in the mainstream of the development of the new American architecture, as it grew beyond the cast-iron facade to the building built of structural steel. Though far from attractive, these towers were eminently practical, and they were widely used.

That the public might not be misled into believing that the Light-House Board was a static organization whose principal job was to keep its lenses clean and its lamps lit, two items of experimental apparatus were displayed. The first was a photometer, used to test the efficacy of various illuminants. A spermacetti candle and the illuminant to be tested were burned, their light cast on either side of a screen placed between them. The screen was moved until the light on both sides had been equalized; in this fashion, it was possible to compare the intensity of various oils against the candle, a relatively constant standard. Presumably, this unit was employed during the long series of fuel and lamp tests the Light-House Board had conducted. The other experimental apparatus was one designed by Joseph Henry for his work on the transmission of sound. Consisting of a conical trumpet with a membrane stretched over the small end, grains of sand placed on the membrane could be seen to move if sound were received. Once again, this represented an advance in the application of an unvarying standard to what had heretofore been largely personal judgment.

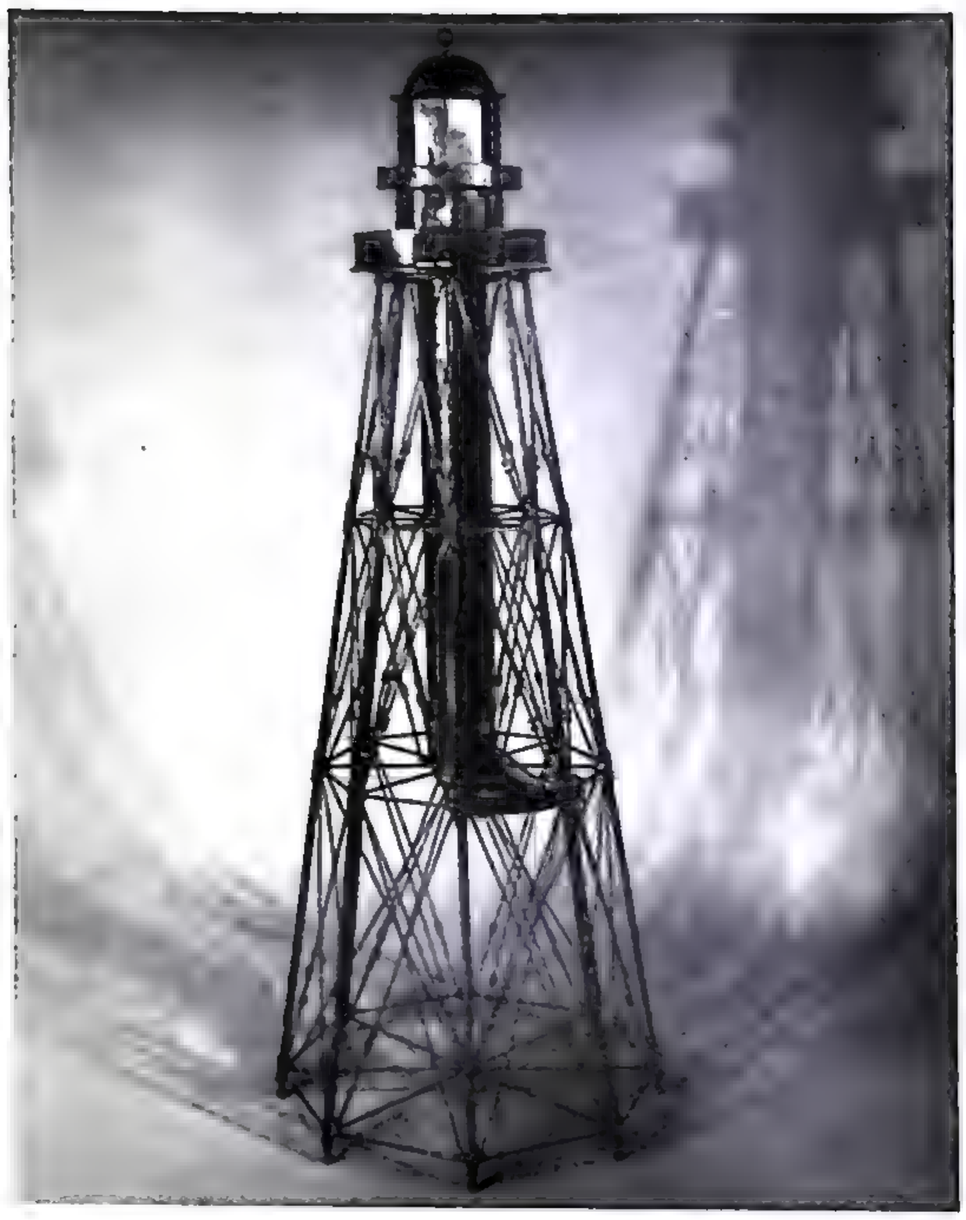
The board had quantities of minutiae on display, all vital to the operation of a lighthouse, but probably only of interest to professionals and fanatics. Similarly, they had available plans, charts, experimental results, and several publications, some to be distributed on request. Presumably little of this came to the attention of the general visiting public.

More likely to have captured the eye and the imagination of the average visitor was the full-sized lighthouse that had been erected outside the building. Equipped with a red-and-white flashing fourth-order lens, lighted every evening, the structure must have been an impressive sight in the landscaped grounds of the centennial. It was, unfortunately, impossible to have the building completed for the opening of the exhibition, and the light was first displayed on 4 July 1876. As a public display, the light was undoubtedly popular; as an exhibition of technical engineering, it was less successful:

> It was the desire of the board to exhibit by full sized model, or by temporary use of some actual construction, a complete lighthouse, embodying some important *engineering* model, such, for instance, as one of our great iron skeletal lighthouses. Want of money prevented carrying out this design, but advantage was taken of the existence of parts of intended iron lighthouse structures to make an exhibit, which, if but an imperfect realization of the idea, enabled the board at least to exhibit an actual lighthouse. A wooden cylindrical substructure representing so much of the really important (in an engineering point of view) tubular member of the South West Ledge lighthouse as appears above the water was made, and on this the

43. U.S.L.H.B. *Annual Report* (1876) published in the *Annual Report of the Treasury Department* (Washington: Government Printing Office, 1877), p. 746.

44. Tayler Correspondence, 19 May 1876.



This model of a skeleton tower for the Florida reefs was displayed at the Centennial Exhibition. The board had originally hoped to display the full-sized tower, but its 110-foot height proved overwhelming. (Courtesy of The Mariners' Museum, Newport News, Virginia.)

real superstructure, comprising the keeper's dwelling and store rooms, surmounted by the lens with its lantern, was erected. The light was shown on the 4th of July, and from that date was maintained until the close of the Exhibition, with the same regularity and under the same rules as if it had been an actual seacoast light, the keeper residing in the structure. But the real engineering significance of the kind of construction of which this exhibit was the type was quite undeveloped, the *tubes* which form their principal member being specifically designed for sub-aqueous rocks covered by considerable depths of water.[45]

The fact that a professional engineer found shortcomings in the exhibit did not detract from its appeal as a public display. The criticism that the display did not make clear the tubular construction, certainly the most significant factor in the structure, is justifiable. More likely to have been understood and appreciated was the obvious juxtaposition of a group of parabolic reflector lamps on the ground with the brilliant Fresnel lens in the tower. Though these lamps do not appear to have been lit, all but the most casual observer must have realized the superiority of the new system.

It is not clear exactly which lighthouse was actually exhibited at the centennial:

> It so happened that the iron work for the superstructure to an iron lighthouse for a marine site, on the tubular plan was nearly ready for erection upon the already constructed tube base on the reef at the entrance of New Haven Harbor, called the *South West Ledge*, while another set of iron work exactly similar was in construction at Baltimore for a work on Ship John Shoal in Delaware Bay.[46]

Which of the two lights was shipped to Philadelphia, or whether parts of both were sent, is not known. The question may be academic, as they were identical in construction; the Ship John Shoal light was first lit in 1877, the South West Ledge light following soon thereafter on 1 January 1878. The placement of the light is confirmed by the official report of the exhibition, published soon after its closing: "This iron structure is to be permanently placed on the caisson on Ship John Shoal, Delaware River, at the close of the exhibition."[47] The structure stands on that location to this day.

The last of the major exhibits of the Light-House Board was also placed outside; immediately adjacent to the lighthouse structure, it consisted of a collection of fog signals. Most prominent was the large bell, struck at intervals by a clockwork mechanism driven by a weight suspended in a small gallows frame next to the display. This was the bell manufactured by George M. Stevens & Co., for which room evidently was not found inside the building. Considerably more significant, both in terms of technological advance and public awareness, were the engine-driven sirens. As one report of the exhibit notes, the siren

> was used to announce the opening and closing of the Exhibition grounds. When it sounded there was no mistaking the hour. Those in the fog about the time of day immediately took their bearings; those in its immediate vicinity were not left in doubt for an instant, and people miles away listened to the song of the siren with a feeling of astonishment not unmixed with awe.
>
> The instrument is one of a class which Professor Joseph Henry, of the Board, and of the Smithsonian Institution, has

45. J. G. Barnard, "Lighthouse Engineering As Displayed at the Centennial Exhibition," *American Society of Civil Engineers Transactions*, VIII (March 1879), 56.

46. Ibid.

47. Board of Executive Departments, 1876, *Report*, p. 106.

This model of the Coffin Patches Lighthouse is typical of the designs that the U.S. Light-House Board used widely in the last half of the nineteenth century. They lent themselves to prefabrication and easy erection, thus minimizing costs. The model was displayed at the Centennial Exhibition, although the light itself had actually been erected in 1858 several miles from Coffin Patches, on Sombrero Key, Florida. (Courtesy of The Mariners' Museum, Newport News, Virginia.)

labored long to perfect, and this is the most effective of its class.[48]

Apparently, the sirens were such a success that the attendants were unable to resist the thrill of cranking up the engines at the slightest provocation. In the face of this din, the feelings of the local populace were not long limited to astonishment and awe. The Boston *Daily Advertiser* reported that the siren "may be heard thirty miles—nay, it *will* be heard, whether you wish to hear it or not. When it shrieks, startled humanity shivers, groans, claps its hands to its ears, and wonders why it is thus."[49] Public outcry finally reached the point that the operation of the apparatus had to be limited to ten-minute periods at opening, closing, and noon of each day. The Light-House Board had finally found an exhibit that captured the public's attention. Certainly no visitor to the centennial could possibly have left without having heard the lonely wail of the new and improved fog siren, though they may never have realized all that lay behind its development.

The Light-House Board was not the only organization to exhibit lighthouse material at the centennial. Surprisingly, the British lighthouse establishment does not appear to have been represented, though the French were. Their Ministry of Public Works displayed drawings of several different lighthouses, and a number of lamps designed for use with the mineral oil they had recently adopted. They also exhibited an electrical light capable of emitting intermittent flashes rather than a simple steady light; this was presumably along the lines of the carbon rod arc light then in use in several French lighthouses. The French exhibit attracted considerable attention, particularly for the engineering achievements represented.

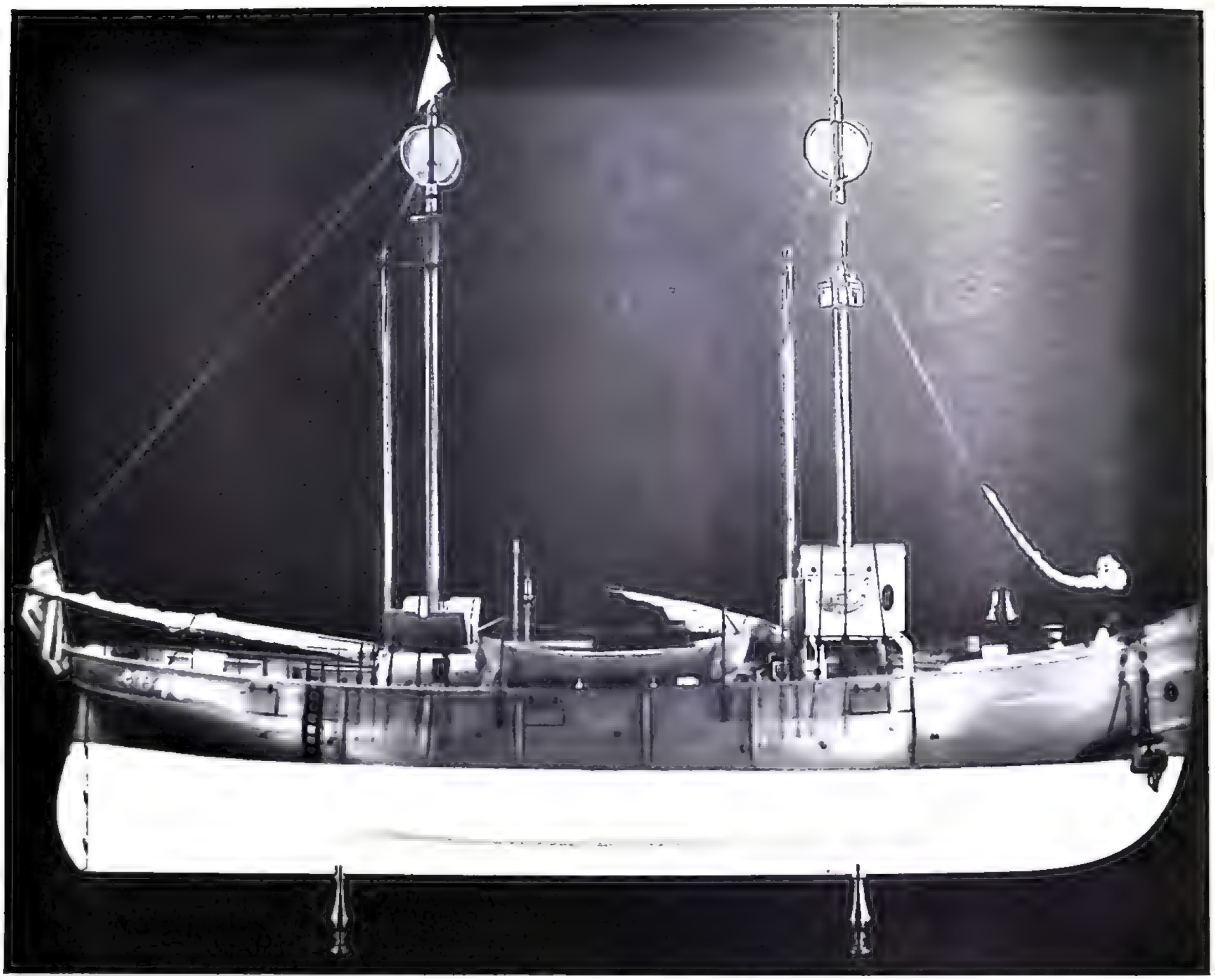
The engineering strength of the French was, like that of the English, in doing the impossible, even if it took a little longer. Such feats of architectural construction obviously represented major accomplishments, a fact recognized by professional engineers and by the judges in charge of awards at the centennial. However, these were solutions to a different set of problems from those that faced the American establishment, solutions only occasionally applicable in this country. In those areas where the French did use iron towers, it was either for a very remote site or to solve a particular problem of construction, and the structure was usually specially designed for the individual instance. Such an approach was not of much help in a country that needed to build and maintain hundreds of towers, often in similar situations, at the lowest cost possible. For this, the standard designs of iron towers developed by the board proved considerably more practical.[50]

For some reason, the U.S. Army Corps of Engineers took it upon itself to exhibit several designs for lighthouses along with its large array of civil engineering material. These were all attempts to design a floating

48. Augustus C. A. Perkes, ed., *The Display of the United States Government at the Great Exhibition* (Philadelphia: George S. Ferguson, 1876), p. 79.

49. Boston *Daily Advertiser*, 29 August 1876.

50. Capt. D. P. Heap, *The Engineer Department, U.S. Army, at the International Exhibition, 1876* (Washington: Government Printing Office, 1884), pp. 392-405. Francis A. Walker, ed., *International Exhibition, 1876: Reports and Awards* (Washington: U.S. Centennial Commission, Government Printing Office, 1880), pp. 28, 34, 62-69.



Lightship number 40 represented the latest design in floating beacons when this model was built for the Centennial Exhibition in 1876. The vessel itself had been launched the previous year by Jackson & Sharp of Wilmington, Delaware, and stationed at Pollock Rip, off Chatham, Massachusetts. This model has recently been restored to its nineteenth-century appearance. (Courtesy of The Mariners' Museum, Newport News, Virginia.)

beacon, and appear to have been undertaken by independent inventors associated with the Corps of Engineers. The inventors were concerned that light-houses could not be placed far at sea, and sought innovative design solutions:

> They would be anchored anywhere on the high seas, and both guide and light vessels to their destination. One inventor represents his light-houses strung across the ocean like street lamps in a city; they could be used as post-offices, telegraph, signal, and life-saving stations. Pilots could await on them the arrival of vessels. In stormy weather ships could tie up to them and outride the gale. All these advantages and more are claimed by the inventors for a floating light-house which would be permanent and stable.
>
> .....
>
> Mr. H. B. Stone shows two models. The flotation is purposely hidden for fear of having his idea stolen. As well as could be ascertained his light-house was swung on gimbals and heavily weighted below and supported on a circular, hollow, wrought-iron ring, the idea being that the ring would move independent of the tower supporting the light. No allowance seems to have been made for the action of the wind.[51]

This last may have been the understatement of the age. It is not surprising that the inventive genius demonstrated by these designers should have been ignored in favor of a solution that had been satisfactorily employed for several hundred years, the lightship. It is little wonder

51. Heap, *Engineer Department*, pp. 491-93.

the Light-House Board was anxious to avoid any confusion with their own exhibit.

Even before the exhibition closed, the Light-House Board was facing the problem of what to do with its display. The lighthouse and fog sirens were the biggest problem in logistics, but they did not raise philosophical issues, as they were already destined for installation at their designated locations. The interior display was another matter. The board felt a considerable effort would be wasted if the material were simply sent back to the Staten Island Depot and eventually dispersed. Therefore, at the meeting of 25 October 1876, they resolved:

> on motion of Capt. Davis, that the light house exhibit as shown in the U.S. building at the Centennial, be brought to Washington and placed as a whole in a room or rooms hereafter to be provided for its reception.
>
> On motion of Capt. Davis, it was ordered that a series of photographs be taken of the light-house exhibit as it now stands in the U.S. building at the Centennial.[52]

Such a display of lighthouse material on a permanent basis was not an entirely new idea; Major Elliot had visited a museum maintained by the *Commission des Phares* in Paris in 1873.

Joseph Henry was fully cognizant of the value of the many collections that had been brought together in the Government Building. He wrote to the president on behalf of the National Academy of Sciences, requesting that provision be made for their exhibition as a unit in Washington. In response to his letter of 13 November 1876, the president ordered that the *status quo* of the collections in the Government Building be maintained until he could seek an appropriation from Congress for the erection of a building for their reception in Washington. This appeared to be a step in the right direction, until the first rainstorm hit Philadelphia. The leaky roof that had plagued the building from the first did considerable damage to the exhibits still in place. As a result, the president agreed to allow those exhibits most likely to be damaged to be sent to Washington in the care of their respective owners. The residue was to remain in Philadelphia, though it could be packed for protection against the elements. In the meantime, Spencer Baird had been actively collecting for the Smithsonian, having declared open season on the foreign exhibitors. He managed to get practically everything that wasn't nailed down, and this material was stored in the Government Building as well. In the face of this growing problem, the president finally decided in January to have the material sent to Washington, that the building might be sold.[53] The situation was not finally resolved until March:

> The Naval Secretary presented a letter from Col. Lyford, U.S.A., dated March 12th, to Hon. R. W. Tayler, Representative of the Treasury Department, upon the Centennial Commission, which letter was referred by him to this office, in which it was stated that the President of the United States, had directed that the articles contributed to the International Exhibition, by the several Executive Departments, be now remanded to their proper custodians, Congress having failed to provide for the erection of a museum for their display in this city.[54]

The exhibit thus became the property and responsibility of the Light-House Board once more, and they were ill equipped to handle it.

The lenses and usable equipment were returned to Staten Island and eventually employed in the service. Whether any provision was ever made for exhibiting the remaining material in Washington is unknown, but this seems unlikely, especially in light of an entry in the board's journals for 14 December 1882:

> The Naval Secretary stated that Prof. Baird, Commissioner of Fish and Fisheries, had asked permission to send to the International Fishery Exhibition, to be held at London in May next, certain models of light-houses, light-ships, buoys, and appurtenances, which the Board had exhibited at the Centennial Exposition held in Philadelphia, in 1876, and which were now in store at the National Museum, and pictures and models of such other aids as have been adopted since.
>
> Ordered, That the Executive Officers be authorized to permit the use of such models as can properly be spared, provided they can be sent to, and brought back from London, without expense to the Light-House Establishment.[55]

Joseph Henry had himself been no great believer in museums. He was, however, the main supporter of the concept of preserving the government displays intact. With his failing health and death in 1878, it seems that the Light-House Board lost any desire it might have had to exhibit the collection intact.

While the centennial display of the Light-House

52. U.S.L.H.B. Journals, vol. 7, fol. 290.

53. Tayler Correspondence, 18 November 1876; 20 November 1876; 19 January 1876.

54. U.S.L.H.B. Journals, vol. 7, fol. 179.

55. Ibid., vol. 9, fol. 179.

Board may not have been the most startling exhibition at the fair, it was a respectable showing. More important, it reveals much about the American lighthouse service in 1876. Although the board overspent their budget by nearly $3,000, the effort was worth it. Interest was stirred, not only among those who had previously been involved, but also among those who had never before had reason to come into contact with the lighthouse service. Finally, and perhaps most important, notice had been served on the general public that the United States had at last been provided with a trustworthy system of navigational aids, a system to rival that of any other nation.

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The Maritime Enterprises of James J. Hill

DON L. HOFSOMMER

THE monumental work of James Jerome Hill in the field of railroad transportation is well known. His devotion to efficient transportation was reflected on all of the so-called Hill Lines, especially on the Great Northern Railway (GN), by low grades, easy curves, and heavy motive power—all designed to reduce the cost of producing transportation. Less well known are Hill's maritime interests. Yet these were logical extensions of the rail properties under Hill's control, and were clear manifestations of his overall philosophy. "The road that can give the longest haul in its own cars over its own lines, can make the lowest rates," Hill argued. Moreover, "If, at the end of the haul, the railroad can transfer the goods or passengers from its own cars to its own steamships . . . , the process is continued." Thus were born the Northern Steamship Company, the Great Northern Steamship Company, and finally the Great Northern Pacific Steamship Company.[1]

Even as Hill was planning for the grand extension westward that would transform the regional St. Paul, Minneapolis & Manitoba Railway into the transcontinental Great Northern Railway, he attended to the fleshing out of operations in Minnesota. Expansion there included the acquisition of existing properties and construction of new lines under the umbrella of the Eastern Railway Company of Minnesota, a subsidiary formed in 1887. When completed the Eastern Railway linked St. Paul and Minneapolis with Superior (and eventually Duluth), and formed a funnel for traffic moving to and from the company's grain elevator and thus to vessels calling at the Head of the Lakes. To his chagrin, however, Hill found that the eastern trunk railroads not only controlled all-rail rates via Chicago but water rates on the Great Lakes as well. Therefore, when Hill's railroads reduced rates to capture traffic destined for Lakehead docks, the navigation companies raised them by a similar amount with no resulting savings for shippers. Hill responded with typical verve: he founded the Northern Steamship Company in 1888.[2]

Hill was not without knowledge in the matter of waterborne commerce, having earlier been a shipping agent for steamboat companies and involved in an entrepreneurial venture on the Red River of the North. He saw in Northern Steamship a means to checkmate eastern trunk railroads while simultaneously extending the eastern terminus of the St. Paul, Minneapolis & Manitoba nearly a thousand miles in one quick stroke. Moreover, Hill was fortunate to have counsel from Mark Hanna of Cleveland as to the nature of vessels that might be employed in the lakes trade and as to the availability of property at Buffalo, New York, for dock and elevator facilities. In short order six vessels were purchased from the Globe Iron Works Company; the first to sail with revenue tonnage was the *Northern Light*, on 18 June 1888. Operations were headquartered at Buffalo under one John Gordon, general manager.[3]

Business was good. For example, in its first full season Northern dominated in the carriage of flour—most of it from C. A. Pillsbury and Washburn & Crosby, Minneapolis millers. The shortage of terminal facilities at Buffalo in 1889 was alleviated through the use of properties belonging to the Delaware, Lackawanna & Western Railroad, and in the following year Northern contracted for seven additional vessels from the Ward Line. Volumes varied, but eastbound freight was usually greater

1. James J. Hill, "Their Advantages to the Community," *The North American Review*, vol. DXXXIV (May 1901), 654.

2. Joseph Gilpin Pyle, *The Life of James J. Hill*, 2 vols. (New York: Doubleday & Company, 1916-1917), I, 415, 421, 423. For a general introduction to the history of navigation on the Great Lakes see Walter Havighurst, *The Long Ships Passing: The Story of the Great Lakes* (New York: The Macmillan Company, 1942).

3. M. A. Hanna, 23 May 1887, to James J. Hill. Amberg 39, 1886-1891. James J. Hill papers, held by the James H. Hill Reference Library, St. Paul. Hereinafter referred to as the Hill papers; George E. Mann, 26 August 1887, to M. A. Hanna. Great Northern Executive Department papers, held by the Minnesota Historical Society, St. Paul. Hereinafter referred to as the GN papers; Pyle, p. 421.

than westbound. Of various eastbound commodities flour was first in tonnage, followed by wheat, corn, matte, and bran; westbound lading consisted of coal, general merchandise, oil, and rails in order of rank. Total shipments in 1890 reached 387,011 tons.[4]

None of this was without potential difficulty. Merchants and shipping interests in Duluth were delighted when the Northern established rates from eastern seaboard points the same as prevailed to Chicago, but the policy instantly angered Chicago interests as well as rail carriers serving that gateway. The Northern predictably favored its corporate cousin, the Eastern Railway of Minnesota, but that did not mean it could afford to alienate the St. Paul & Duluth, the Chicago, St. Paul, Minneapolis & Omaha, or the Northern Pacific—Eastern's competitors with which the steamship company connected at Superior or Duluth. Even the nature of loading westbound tonnage could affect operations and relationships. For instance, coal consigned to Eastern's terminal at Superior went first into the holds at Buffalo, followed by general merchandise usually billed to Duluth. This required that the vessel make its first stop at Duluth—favoring that city over both Superior and the Eastern's (i.e., Hill's) competitors and necessitating rehandling of package freight destined for Superior.[5]

Each shipping season brought new variables as well as the usual problems of competition. The movement of iron ore from northern Minnesota became an important new traffic commodity on the lakes during the 1890s, but merchandise and other commodities were under constant attack by the eastern trunk railroads and their associated lake lines. Rates were, as *Railway Age* noted, "unsettled," and strong competition for wheat and flour traffic came from the fledgling Minneapolis, St. Paul & Sault Ste. Marie Railway (Soo Line). Water-rail tariffs, noted John Gordon, had to be sufficiently low to attract business from all-rail routes, but the intermodal alternatives offered by Northern were subject to important disadvantages: slower transit time, higher insurance rates (across the lakes), and the need to handle cargo six times as opposed to only two times via all-rail routings. Finally, there was the need to maximize use of Northern's vessels, but docks and elevators were often clogged, and Mother Nature frequently lengthened transit times with severe storms, delayed opening of the shipping season, and closed it prematurely. As a result, Northern's freighters made an average of only sixteen to seventeen trips annually in short seasons, nineteen to twenty if longer.[6]

Vessel	*Trips*	*Tons Carried*	*Gross Earnings*	*Expenses*	*Earnings*
Northern King	15	53,602	$ 83,900.00	$ 40,878.61	$ 43,021.39
North Wind	16	55,467	79,800.00	41,916.71	37,883.29
Northern Queen	16	58,528	87,000.00	40,997.31	46,002.69
Northern Wave	15	53,744	83,600.00	39,710.81	43,889.19
Northern Light	15	53,802	79,500.00	39,108.93	40,392.07
Northern Star	16	58,456	89,500.00	40,926.79	48,574.21
		333,599	$503,300.00	$243,539.16	$259,762.84

Nevertheless, the Northern Steamship Company boldly advertised itself as "A First Class Through Rail and Lake Line" to major eastern points by way of its own docks at Detroit, Cleveland, and Buffalo. Connections at Buffalo, in order of preference, were the New York, Lake Erie & Western; the Delaware, Lackawanna & Western; the Lehigh Valley; and, the Union Transit Company and Diamond Despatch (operating via the Erie Canal). On the west, the preferred link was obviously the Eastern Railway of Minnesota and through it the Great Northern Railway, Eastern's parent and successor to the Manitoba Road, to which the capital stock of the Northern Steamship Company passed on 1 February 1890.[7]

4. John Gordon, 8 January 1890, to J. J. Hill; John Gordon, 3 July 1890, to J. J. Hill; GN Executive Department, Northern Steamship Company, Tonnage Statement 1890. GN papers.

5. William F. Phelps, 19 June 1888, to J. J. Hill; John Gordon, 8 January 1889, to J. J. Hill; John Gordon, 10 October 1889, to H. D. Minot. GN papers.

6. *Railway Age* (1 March 1890), p. 142; John Gordon, 5 February 1890, to S. M. Felton; John Gordon, 30 May 1891, to J. J. Hill. GN papers; John Gordon, 6 December 1892, to J. J. Hill, Hill papers.

7. *Beason's Inland Marine Directory*, 1895 (n.p.), p. 18; John Gordon, 5 December 1893, to James J. Hill. GN papers.

The *North West* was launched on 6 January 1894. (Courtesy of Burlington Northern, Inc.)

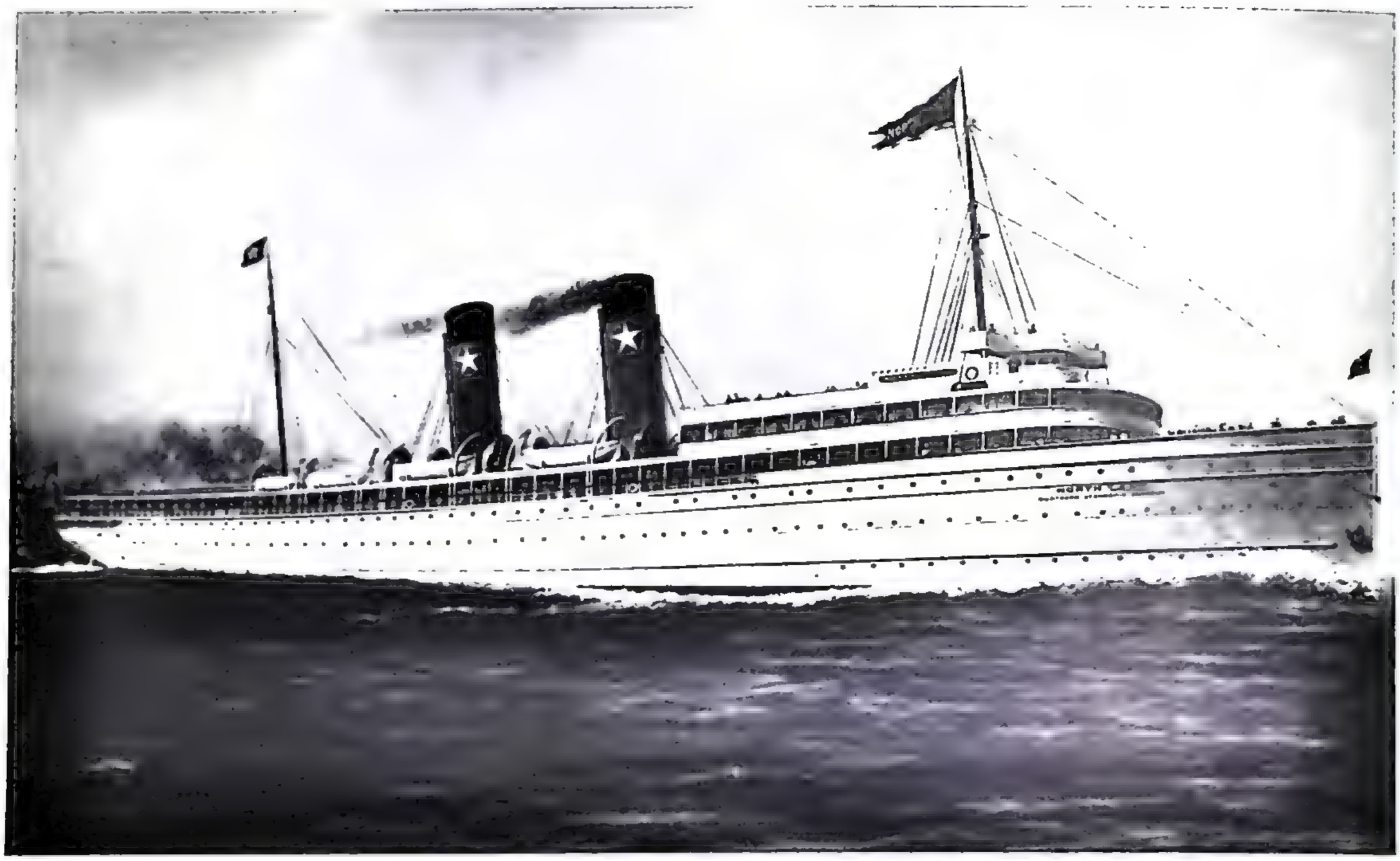
Despite low rates resulting from overcapacity in rail and water transport, the devastation of the Panic of 1893, and Hill's feeling that Northern Steamship was not effectively managed, the Great Lakes business proved marginally profitable during the 1890s. The statistics from 1893 are indicative. (See table on page 194.) Net earnings "above all expenses" for 1893 were $144,762.84.[8]

Northern's freighters carried passengers as an incidental part of their chores, but the company's initial interest was in the movement of freight. That perspective broadened gradually. In 1891 Mark Hanna chided Hill, asking: "Is it not about the right time to take up the question of building some passenger boats to incorporate with the Northern Line?" Hill was receptive. A year later Northern ordered two elegant passenger steamers, the "Majestic Twins," *North West* and *North Land*. Both were 386 feet long with 44-foot beams and boasted 8,000 horsepower capable of yielding speeds of over 22 miles per hour. They could accommodate 500 passengers and carried a crew of 180. Accommodations were superb, "with no lack of its best features of first class ocean steamers." The quality of cuisine reflected this, and was "fully equal to the most desirable restaurants on shore or the best Atlantic liners." The vessels were even equipped with ice-making machines, and orchestras were hired to "render selected programmes afternoons and evenings." The two vessels cost $1.7 million; both were constructed by the Globe Iron Works of Cleveland, Ohio. The *North West* was launched on 6 January 1894, the *North Land* a year later, on 5 January 1895.[9]

Service began in June 1894. The arrival of the *North West* in Duluth on the eighth was greeted by a cheering

8. John Gordon, 20 January 1894, to James J. Hill. GN papers.

9. M. A. Hanna, 21 July 1891, to J. J. Hill, GN papers; *Railway Age* (8 July 1892), p. 518; *St. Paul Pioneer Press*, 7, 8 January 1894; *Chicago Tribune*, 7 January 1894; *St. Paul Pioneer Press*, 6 January 1895.



The *North Land* offered weekly service in each direction between Buffalo and Chicago during the seasons 1911-1916. (Courtesy of Burlington Northern, Inc.)

crowd that included James J. Hill who inspected it before the return voyage to Buffalo. Delays in transit during the 1894 season were minimal, usually the result of problems at the Sault Ste. Marie locks, and passengers made easy connections with Eastern Railway trains for the Twin Cities and the West. The *North West* made sixteen trips and carried 8,300 passengers in 1894.[10]

The Northern Steamship Company employed both the *North West* and the *North Land* for the rest of the decade in what *Railroad Gazette* called "an interesting and agreeable experiment in lake passenger business." The *North Land* made its first revenue trips early in June 1895, with 225 excursionists bound from Buffalo to Duluth. John Gordon was happy with the vessel's performance, taking only eight hours and fifty minutes from the pier at Cleveland to the dock at Buffalo—only three hours and forty-eight minutes from Erie to Buffalo. Ports of call for the "Majestic Twins" included Buffalo, Cleveland, Detroit, Mackinac Island, Sault Ste. Marie, and Duluth. Rates were reasonable: Duluth to Buffalo, $16.50; Duluth to Detroit, $12.00.[11]

Change was in the offing, however. For the season of 1901 the *North West* and the *North Land* were assigned to a new run, from Chicago to Buffalo, making calls at Milwaukee, Harbor Springs, Mackinac, Detroit, and Cleveland. The *North West* was later returned to the Duluth-Buffalo run, and service on Lake Superior was established to Marquette and Houghton. The *North Land* protected the Chicago-Buffalo route.[12]

These alterations implied reality: all was not well with Hill's "experiment." For that matter all was not well with Northern Steamship Company. In 1901 total operating expenses exceeded total operating income, but even earlier Hill had become disenchanted with the ratio of expenses to income. Revenues from the passen-

10. *St. Paul Pioneer Press*, 8, 9 June 1894; *Railroad Gazette* (3 August 1894), p. 538; ibid. (28 September 1894), p. 672.

11. *Railroad Gazette* (11 January 1895), p. 27; *Scientific American* (27 July 1895), p. 49; F. E. Ward, 7 June 1895, to J. J. Hill; A. W. Clark, 19 June 1897, to A. V. McCleneghan. GN papers.

12. *Railway Age* (8 February 1901), p. 99; ibid. (12 April 1901), p. 427; ibid. (27 September 1901), p. 312; *Official Guide of the Railways* (March 1906), p. 609; R. I. Farrington, 24 February 1909, to F. C. Cruger. GN papers.

ger vessels, except for the seasons of 1898 and 1899, were increasingly depressing, and the future of the freight business was no brighter. An officer of the Great Northern explained the plight of the steamship company's freighters: "we are not in a position to take advantage of the high ore and grain rates that are offered from time to time." The problem centered on the powerful milling interests of Minneapolis which, if displeased in any way with the Great Northern and its subsidiaries, refused to purchase grain billed on the GN or to ship flour via the Eastern Railway and the Northern Steamship Company. It was blackmail of sorts, Hill recognized it as such, but he usually bent to it. This kept rates, and thus profitability, low. In 1899 Hill attempted to increase tariffs, but, to his very great dismay, the millers carried out their threats and diverted business to the Soo Line and the Minneapolis & St. Louis. Consequently, although lake rates were "very high and profitable to vessel owners who can take advantage of them," management of the Great Northern concluded that "the boats were of more value to other people than to us and we might as well sell them. . . ."[13]

It was simply a matter of time before the Northern Steamship Company would vacate the carriage of freight on the Great Lakes. The Baltimore & Ohio Railroad expressed interest, as did other parties. In the end, however, Northern's six freighters, two lighters, and the Great Northern Elevator Company properties at Buffalo were sold to the Purchasing Committee of the Trunk Lines (Pennsylvania, New York Central, Delaware, Lackawanna & Western, Erie, and Lehigh Valley) for $1.5 million.[14]

The future of Northern's passenger business was equally uncertain. Operating revenues essentially matched expenses from 1905 through 1910, but Hill wondered if the *North West* and the *North Land* might not be more profitably employed in coastal trade between Portland and San Francisco. Before a decision was made, however, the *North West*—while docked at Buffalo on 3 June 1911—burned, with severe damage. Hill initially favored repairs, but changed his mind after plans were drawn. Thus the *North West* lay at Buffalo until sold in 1917. Meanwhile, the *North Land* offered weekly service in each direction between Buffalo and Chicago during the seasons 1911-1916. "In All the World No Trip Like This," Northern continued to advertise, but with only halfhearted energy.[15]

Indeed, a mere 4,763 passengers—mostly excursionists—were carried in 1915. Senior officers of the Great Northern Railway had long since determined that operation of Northern Steamship seemed "to be for practice or amusement, rather than revenue." Therefore, when the union representing the *North Land*'s crew demanded higher wages in 1917, the steamship company's management seized the opportunity to dismiss all help and suspend operations. Demand for transportation occasioned by this country's entry into World War I allowed disposal of the *North Land* in 1918, although the contract was abrogated in 1920 and the vessel again became the property of Northern Steamship. Sad to say, the gallant vessel lay in two pieces, having been severed to allow passage through the Welland Canal, but her real liabilities were that she was a passenger boat designed for use on the Great Lakes, and that she was a "double screw" vessel requiring a double shift of engineers. There was no hope that she would be returned to service, and as a result, the *North Land* was sold to the Sorel Mechanical Shops in 1921. The general manager's office at Buffalo had already been closed effective 31 December 1918, and the Northern Steamship Company was itself disincorporated in 1926.[16]

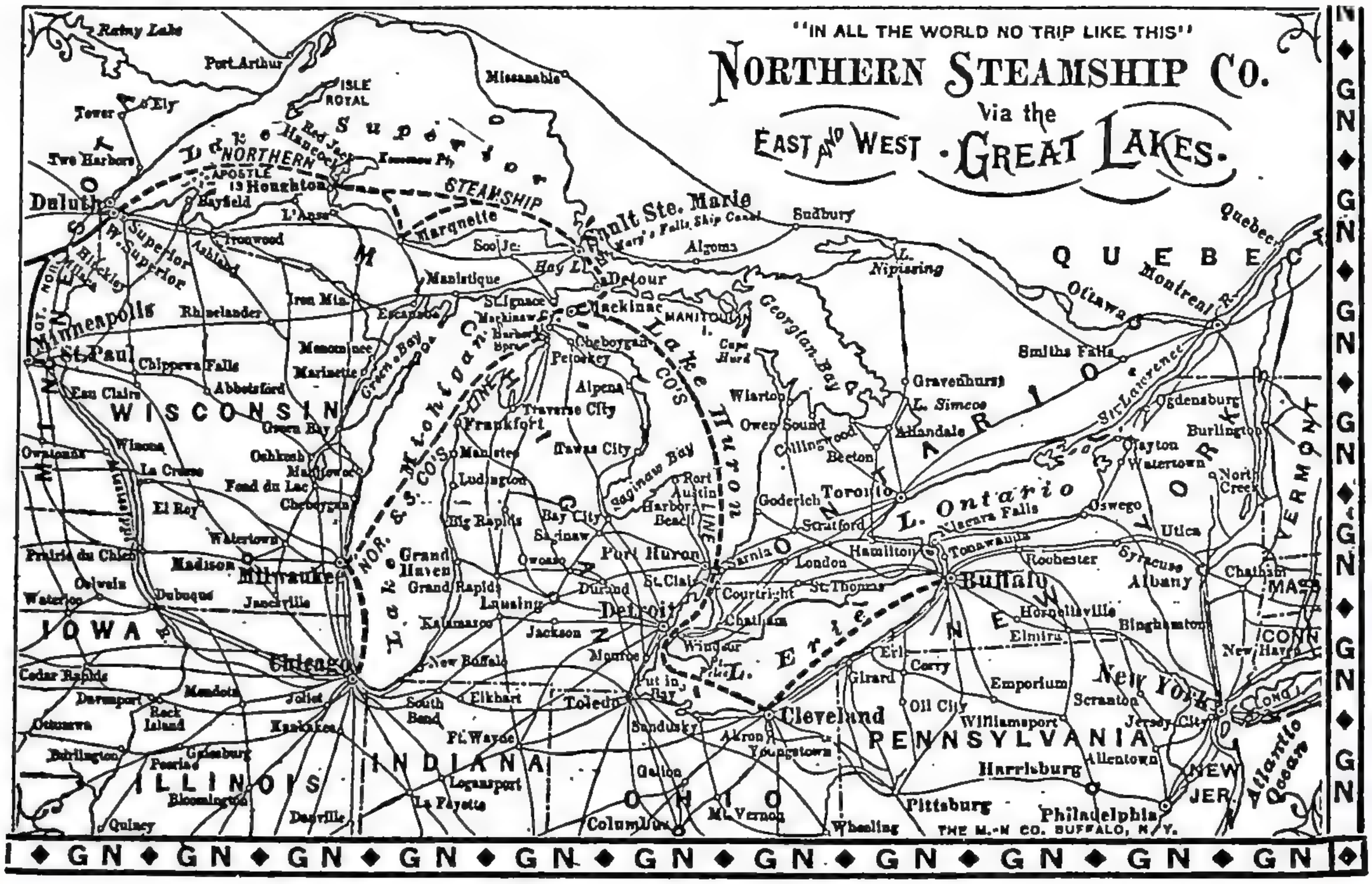
The record of the Great Northern Steamship Company was roughly analogous. It represented Hill's desire to control traffic for the longest possible distance, to produce ton miles at the lowest possible rate, and to tap the Far East. Hill's hope for expanded trade opportunities with the Orient were in part philosophical and altruistic, and in part practical and selfish. He recognized that successful production had to be balanced by successful marketing; that the Far East represented a vast potential market for the United States; that low transportation charges were required to promote an expanded trade; and, that creating a demand for American products through efficient and economical transportation would benefit his Great Northern Railway by

13. J. J. Hill, 11 March 1899, to W. C. Farrington; E. D. Underwood, 11 January 1900, to L. W. Hill; L. W. Hill, 26 January 1900, to F. D. Underwood. GN papers; *Railway Age* (6 February 1903), p. 200.

14. R. I. Farrington, 28 February 1903, to J. G. Drew. GN papers.

15. F. C. Cruger, Memo, 22 March 1909; J. J. Hill, 12 June 1911, to L. W. Hill; *Official Guide of the Railways* (June 1916), p. 715.

16. H. M. Sells, 15 January 1925, to G. R. Martin; E. T. Nichols, 30 November 1903, to R. I. Farrington; George H. Hess, 15 June 1921, to G. R. Martin; Judson M. Sells, 4 June 1920, to G. R. Martin. GN papers.



Map showing Northern Steamship Company's service area. (Courtesy of Burlington Northern, Inc.)

balancing its flow of traffic. Indeed, all of this was part of Hill's thinking even before the GN began through service to Puget Sound in 1893.[17]

Perhaps the Panic of 1893 further influenced Hill to look to the Orient. Company representatives sent to China, Japan, and Korea during those difficult years found several opportunities and recommended the early establishment of a steamship line under GN's auspices. After all, they noted, the rival Northern Pacific had established such a line from Tacoma; the Southern Pacific owned the Pacific Mail Steamship Company as well as the Occidental & Oriental; the Atchison, Topeka & Santa Fe had signed a contract with a Japanese steamship company for international business moving via San Diego; and, the Canadian Pacific boasted wonderful express steamers working out of Vancouver, British Columbia. Hill pondered the matter, and then signed a cooperative contract with Nippon Yusen Kaisha (NYK, the General Mail Steamship Company of Japan) which, he noted, had "great advantages in collecting and distributing traffic for all the ports" between Vladivostock and Bombay. Collaterally, Hill labored to arrange growing shipments of wheat, flour, apples, rails, and cotton delivered to the docks in GN cars.[18]

At the same time, Hill studied the establishment of an associated steamship company. It was "just a matter of time," opined the *Seattle Post Intelligencer* early in 1899. To be sure, the Great Northern had acquired expansive property near Seattle at Smith's Cove and was moving to develop a ship canal and a plan for a lengthy dock and auxiliary rail trackage. Hill also sought advice from the respected naval architect Prof. John H. Biles as to "very large" ships. This, of course, reflected Hill's devotion to economy of scale as applied to transportation devices. Even before the incorporation

17. Schonberger, Howard, "James J. Hill and the Trade with the Orient." *Minnesota History*, vol. 41 (Winter 1968), 178-90; John Haskell Kemble, "The Transpacific Railroads, 1869-1915," *Pacific Historical Review*, vol. 18 (August 1949), 331-43.

18. J. J. Hill, 7 June 1896, to Jacob Schiff. GN papers; *The Northwest Magazine* (June 1902), pp. 14-19; Schonberger, pp. 185-86; *Railway Age* (24 July 1896), p. 61; ibid. (7 August 1896), p. 106.

of the Great Northern Steamship Company on 3 August 1900, he projected construction of four ships that would be half again as big as any merchant vessel ever built in this country. In the end, however, only two ships were ordered—the *Minnesota* and the *Dakota*.[19]

The size of these two would alone make them spectacular—622 feet in length with beams of over 73 feet; capable of handling 6,500 tons of coal for fuel and 16,500 tons of freight; able to provide first class, intermediate, and steerage accommodation for over 1,800 persons; large enough to require a crew of over 250, mostly Asiatics. They would be constructed—surprisingly and unfortunately—not by an established firm, but by the new Eastern Shipbuilding Company of Groton, Connecticut. Delay followed delay until 16 April 1903, when Miss Clara Hill, daughter of James J., christened the *Minnesota*, and until 6 February 1904, when the *Dakota* was launched. Even then fitting out was required, and the two were not ready for revenue service until 1905.[20]

Meanwhile, Hill missed no opportunity to assert the advantages and opportunities of trade with the Orient—especially when the GN vessels would finally be ready. "We will be prepared to make rates on the traffic going to the Orient by way of the Pacific Coast—to compete with rates from Europe by way of the Suez Canal," he told Mark Hanna in 1902. "In other words, we expect to be able to make such rates of transportation from points in the United States as will enable American manufacturers of iron and its products, cotton, both raw and manufactured, flour, and any other articles, to compete with the products of European nations." It was vintage Hill. "This will call for lower rates than in the past and lower than can be made by small ships," he concluded. The huge cargo capacity of the *Minnesota* and the *Dakota* would facilitate such economical rates, Hill predicted.[21]

On the other hand, neither did Hill miss an opportunity to warn of potential problems. He worried about the cost of manufacturing in the United States by comparison to wage rates of Europe and Asia, and was thoroughly alarmed at regulations and intervention by the federal government in matters of trade. The Elkins Act, passed in 1903, was especially offensive in that it implemented Interstate Commerce Commission orders requiring railroads to publish import and export rates, i.e., information that could be used by foreign tramp steamers—especially those of British registry—to the disadvantage of railroad companies operating their own vessels and/or offering joint through rail/water rates to and from the United States and the Far East. "To make the trip they [the *Minnesota* and the *Dakota*] must carry large cargoes, so we must make the tonnage to fill them," Hill warned. Low rates were essential. "In this Oriental business, we are not competing alone with the other railroads, but upon freight from New York to the Orient by way of the Cape and via the Suez Canal and with European Commerce by sea," he noted. Moreover, "to handle these ships there must be the greatest dispatch; we can't have any lying around for six or seven days waiting to be loaded." Delays would raise overhead costs to intolerable levels and defeat Hill's purposes.[22]

Thus even as the *Minnesota* and the *Dakota* were about to enter revenue service Hill was concerned over their prospects for their success. "I would rather undertake to build a thousand miles of railway than to build two ships," he bellowed. Delays had been irksome, costs had escalated, the federal government had refused to grant subsidies to upgrade the country's merchant marine and had involved itself in international shipping with counterproductive regulations. "I shall not build more ships for the Oriental trade until I know that their business will be helped and not hindered by the United States government and people," Hill growled.[23]

In any event, the *Minnesota* sailed into Seattle to a tumultuous welcome late in 1904. And there was great hoopla when she departed for Yokohama, Kobe, Hong Kong, and Manila on 23 January 1905, loaded with rail, copper ingots, cotton, flour, and general merchandise plus a large number of passengers. It was the largest cargo loaded by a single vessel to that time; Hill's prediction that the new ships would "revolutionize the carrying trade of the Pacific" appeared to have come true. To be sure, the *Minnesota* on its second trip handled a star-

19. *Seattle Post Intelligencer*, 3 March 1899; ibid., 12 November 1898; *Northwest Magazine* (June 1899), pp. 30-31; *Railway Age* (23 October 1903), p. 560; J. J. Hill, 8 August and 4 September 1899, to Prof. John H. Biles. Hill papers; W. Kaye Lamb, "The Trans-Pacific Venture of James J. Hill: A History of the Great Northern Steamship Company," *American Neptune* (July 1943), pp. 185-204.

20. Lamb, pp. 187-88; Martin, p. 545; *Fargo* [North Dakota] *Forum*, 29 April 1956.

21. J. J. Hill, 12 May 1902, to Mark Hanna. GN papers.

22. James J. Hill, "The Future of Our Oriental Trade," *World's Work* (August 1905), pp. 6405-7; *New York Commercial*, 19 April 1900.

23. Gary Dean Best, "James J. Hill's 'Lost Opportunity on the Pacific'," *Pacific Northwest Quarterly*, vol. 64 (January 1973), 8-11; Lamb, p. 192; *Spokane Spokesman's Review*, 18 August 1905.

The interrelationship of James J. Hill's rail and maritime ventures are evident in this view made at Smith Cove, near Seattle, in 1905. In the foreground is Great Northern's premier passenger train, the *Oriental Limited,* and nearby at Pier 88 are both the *Minnesota* and the *Dakota*. (Courtesy of Burlington Northern, Inc.)

tling cargo of seventy locomotives plus a large general lading, and the *Dakota* began her initial transpacific run on 20 September 1905, with no less than 20,000 tons of flour. It was also a matter of great importance to Hill that Baron Komura, the Japanese peace envoy, returned to his homeland aboard the *Dakota* on her maiden voyage following the Portsmouth Conference that ended the Russo-Japanese War. It all seemed to signal everlasting good will and prosperity.[24]

The year 1906 proved to be a watershed in the affairs of the Great Northern Steamship Company. Business was good. The flagship vessels, the *Minnesota* and *Dakota,* made headlines with record cargoes, and the company retained two smaller vessels, the *Shawmut* and the *Tremont*, leased from the Boston Steamship Company since 1902. Additional service was rendered under a tripartite arrangement among the Great Northern Railway, the Northern Pacific Railway, and the Boston Tow Boat Company for Manila and other Pacific locations. Furthermore, NYK resumed full operation following Japan's war with Russia. At the same time, because of the great publicity surrounding the *Minnesota* and the *Dakota,* and because of their notable appointments, passengers found it fashionable to sail on them. Single rate fares from Seattle to Yokohama were: first class cabin, $200; second class cabin, $150; third class cabin, $85; and, "Asiatic steerage," $51.[25]

Not all was well, however. The *St. Paul Globe* had waxed eloquent about the *Minnesota* and the *Dakota.* They were "more than monstrous machines, more than commerce carriers," its writers asserted: they were "embodiments of a splendid idea." Yet Hill had become disillusioned. The great draft and slow speed (12½ to 14 knots under load) of the huge vessels proved to be immediate liabilities. So was the matter of recovering the cost of investment—a startling $7.8 million for the two. Moreover, both vessels suffered frequent fires in their coal bunkers, and both experienced early fractures of their sternposts. External variables included a boycott in China, rising labor costs in the United States,

24. *Seattle Times,* 23 December 1904; Lamb, pp. 193-94; *St. Paul Pioneer Press,* 6 September 1905.

25. F. B. Clarke, 20 October 1902, to R. I. Farrington, GN papers; *Seattle Times,* 21 April 1903, 7 October 1904, 18 November 1904, 6 November 1905; *Seattle Post Intelligencer,* 3 October 1905.

overcapacity in the Pacific carrying trade, and subsidies by other countries for their merchant marines with no corresponding support at home. Additionally, Japan was increasingly a rival. "Japan hereafter will be our commercial enemy and not a market for our goods," Hill predicted. In sum, Hill concluded that the great vessels had been "highly extravagant to build and are an unsatisfactory investment."[26]

Events then took a particularly depressing turn. On 3 March 1907 the heavily laden *Dakota*, making full speed in hopes of making Tokyo Bay before nightfall, struck a reef. All 726 persons aboard reached safety, but the huge ship—after making only seven trips—was lost. The disaster understandably caused a sensation; the *Dakota* was the largest and most costly vessel lost at sea to that time. Not surprisingly, higher insurance rates added to woes of carriers in the transpacific trade.[27]

Bad news followed bad news. Business slumped further as the result of competition—especially from Japanese steamship companies—and further restrictions and regulations imposed by the ICC on through rail/water rates. Arrangements with the Boston Steamship Company and the Boston Tow Boat Company were ended; thereafter the *Minnesota* was the only American vessel in regular service on the Orient run from Puget Sound. Furthermore, the sheer size of the *Minnesota* constantly worked against her. All too frequently she was tied up waiting for adequate cargo to fill her huge holds; this delay to lading angered shippers who more and more looked elsewhere. Hill's devotion to "bigness" instead of speed, frequency, and flexibility had come to haunt him. Schedules for the great ship were reduced to only four per year. Deficits mounted, and the company eagerly but unsuccessfully looked for a buyer to take her off its hands. Small wonder. On its thirty-fourth round-trip voyage, in 1913, the *Minnesota* handled only 17,441 tons of freight (15,770 tons of it on the outbound segment) and a mere 589 passengers (187 first class, 38 second class, 31 third class, and 333 steerage).[28]

The days of the *Minnesota* on the Pacific run were numbered. Losses from operation ran 2-to-1 over revenues, although clearly intermodal business benefited the parent, Great Northern Railway, but deficits for the steamship company were certain to be increased with passage in early 1915 of the Seamen's Act that essentially required American crewmen instead of less expensive and more productive Asiatics. Indeed, passage of that legislation convinced the rival Southern Pacific to dispose of its Pacific Mail and likely would have put an end to the Great Northern Steamship Company then and there, had not World War I provided an alternative.[29]

Noting the growing need for transportation from the eastern seaboard, Hill urged that the *Minnesota* be taken to the Atlantic as soon as possible. Other senior officers, however, simply wanted to dispose of the huge ship. One worried that "our chance of selling it will slip away if we do not take advantage of it during the war." In any event, when she returned to Seattle on completion of her fortieth round trip to the Orient, she was loaded with a record tonnage bound for England, and left Puget Sound for the final time on 14 November 1915. But it was an ill-fated trip marred by severe mechanical problems. Indeed, the huge freighter had to be towed into San Francisco where inspectors demanded that she be outfitted with new boilers before putting to sea again. This was done, but by agreement dated 20 January 1917, the vessel was sold for $2.75 million to the Atlantic Transport Company which passed her through the Panama Canal and landed her at New York on 8 March.[30]

During her war service the *Minnesota* performed splendidly, hauling monumental cargoes to Great Britain and France, but the postwar doldrums quickly claimed her. The *Minnesota* was towed across the Atlantic late in 1923, and scrapped in Germany. The Great Northern Steamship Company, whose operating losses were constant from the time the *Minnesota* and

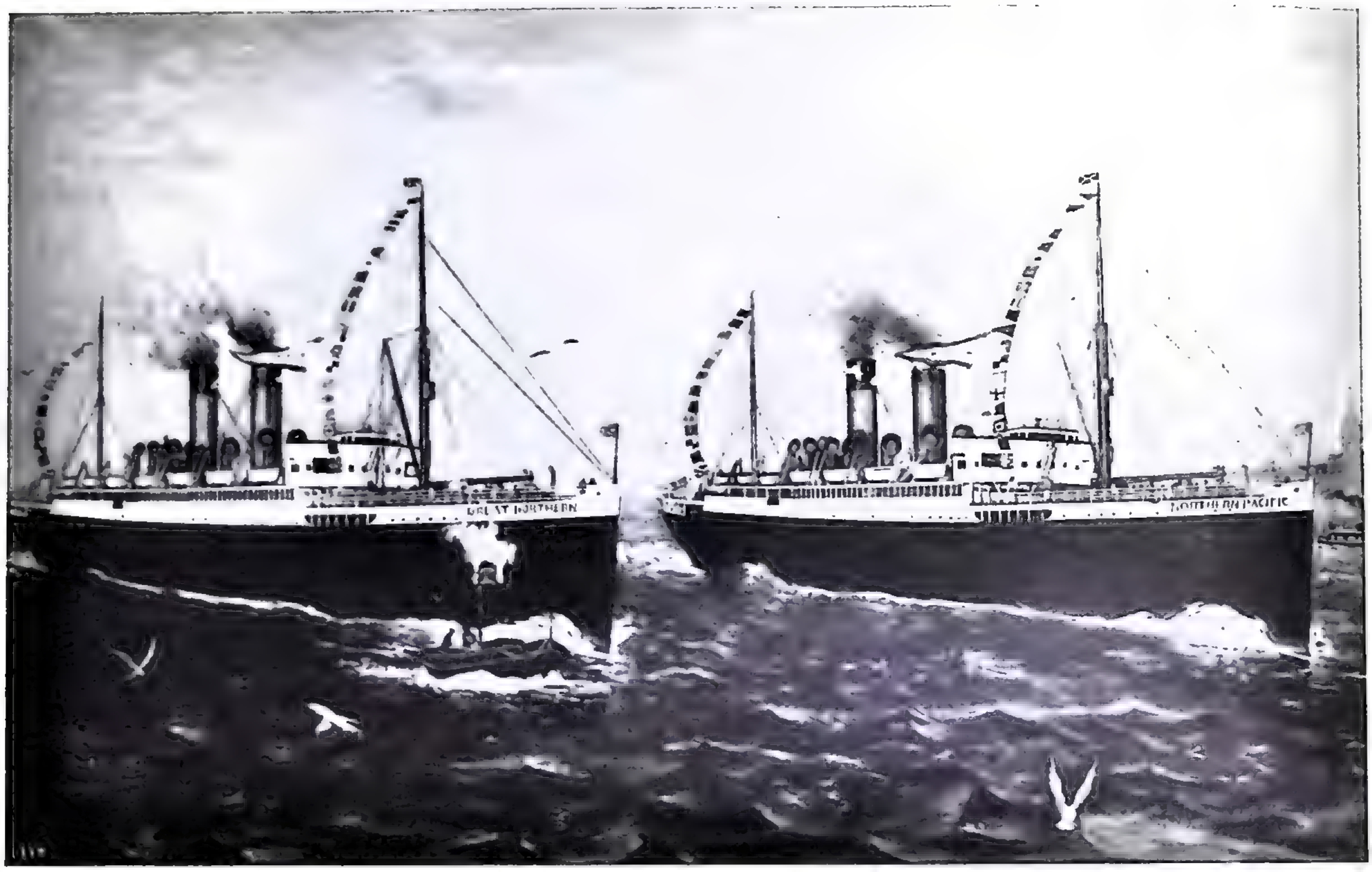
26. *St. Paul Globe*, 7 February 1904; E. T. Nichols, 13 April 1905, to J. D. Farrell. GN papers; Lamb, p. 194; *Seattle Post Intelligencer*, 30 September 1905; *San Francisco Chronicle*, 1 October 1905; *Railroad Gazette* (4 January 1906), p. 4.

27. Lamb, pp. 196-97; C. C. Lacey, 8 June 1907, to E. T. Nichols. GN papers.

28. Lamb, p. 197; *Railway Age* (7 August 1908), pp. 689-90; ibid. (2 October 1908), pp. 1039-40; ibid. (23 October 1908), pp. 1181-83; E. T. Nichols, 12 August 1912, C. R. Gray; L. C. Gilman, 2 July 1913, to C. R. Gray. GN papers.

29. Lamb, pp. 199-200; The Panama Canal Act had a similarly chilling effect. See Franklin Snow, "The Railways and the Panama Canal," *The North American Review*, vol. 224 (March-April-May 1927), 29-40, and "Separation of Rail from Water Carriers," *Journal of Political Economy*, vol. 23 (June 1915), 612-14; Don L. Hofsommer, *The Southern Pacific, 1901-1985* (College Station: Texas A & M University Press, 1986), pp. 152-53.

30. L. W. Hill, 3 August 1914, to J. J. Hill. Hill papers; L. W. Hill, 3 September 1914, to M. R. Brown; H. Pothern, 18 February 1946, to G. H. Hess. GN papers; *Seattle Daily Times*, 18 November, 19 December 1915; *New York Chronicle*, 22 December 1915; Lamb, p. 202.



The "Twin Palaces of the Pacific"—the *Great Northern* and the *Northern Pacific*. (Courtesy of Burlington Northern, Inc.)

the *Dakota* entered revenue service in 1905, lingered without corporate utility until its demise on 27 September 1927.[31]

Given his generally unpleasant experience with things nautical, it is extremely difficult to understand why Hill plunged forward with yet another scheme —this one to link Flavel, Oregon (near Astoria, 107.4 rail miles west of Portland), with San Francisco. During the summer of 1913, two ships were ordered for what a year later became the Great Northern Pacific Steamship Company, owned in equal shares by the Great Northern and the Northern Pacific through their jointly held Spokane, Portland & Seattle Railway (SP&S). Not surprisingly the names of the new ships would be *Great Northern* and the *Northern Pacific;* they were designed and built by the William Cramps & Sons Ship & Engine Building Company of Philadelphia. Both were 524-foot, triple-screw, passenger and cargo, oil-burning turbine steamships capable of 23 knots and were unabashedly advertised as the "Twin Palaces of the Pacific."[32]

The initial revenue trip of the *Great Northern*, early in 1915, from the yards at Philadelphia to San Francisco, was billed as a convenient and fashionable means of travel to the Panama-Pacific Exposition, but a combination of overbooking and an inexperienced crew spelled very bad press and great embarrassment for the new company and Hill's railroads. The *Northern Pacific* followed in March, but meanwhile the *Great Northern* made a well-publicized and very successful trip from San Francisco to Los Angeles and then to the Hawaiian Islands before initiating regular service effective 23 March between Flavel and San Francisco. The *Northern Pacific* made her first revenue run on 19 April.[33]

31. *St. Paul Dispatch*, 16 January 1923; *Minneapolis Star*, 29 November 1923.

32. L. W. Hill, 31 August 1913, to C. R. Gray; L. C. Gilman, 11 March 1914, to L. W. Hill. GN papers; J. J. Hill, 17 December 1914, to F. L. Hine. Hill papers; *Official Guide of the Railways* (June 1916), p. 855.

33. L. C. Gilman, 5 February 1915, to L. W. Hill; L. C. Gilman, 23 March 1915, to L. W. Hill; L. C. Gilman, 19 April 1915, to L. W. Hill. GN papers.

Volume was good for a while. With their razorlike bows and tall twin stacks with masts pitched at the same angle, these rakish speed queens raced 565 nautical miles three times weekly on 26½-hour runs from Pier 9 at the foot of Broadway in San Francisco to waiting trains for Portland at the SP&S dock in Flavel. Patrons appreciated their reliability, and they similarly applauded the ships' five decks, superb appointments, and excellent cuisine. Each vessel could handle 800 passengers and boasted a crew of 200. The Great Northern Pacific Steamship Company bragged that its ships were "without doubt the fastest and finest ocean-going express steamers ever built in the United States and flying the United States flag," and few debated the issue. Fares were reasonable: $20 for first class; $15 for second; and $8 for steerage. Meals were included. On many trips during the summer of 1915, the ships were booked to capacity, especially in first class, and by fall they handled "about 500 passengers per voyage, the business down being much larger than that northbound." On 7 December 1915, however, the *Northern Pacific* handled a mere 101 passengers and 1,511 tons of freight southbound, and on the return voyage, only 198 passengers and 450 tons of freight. Unfortunately it was a harbinger.[34]

During the company's first nine months of operation it netted $286,000, but thereafter expenses outran income. To maximize potential, the *Great Northern* was shifted during the winter season to excursion runs between San Francisco and Hawaii in the hope that with fewer trips on the San Francisco-Flavel run the *Northern Pacific* would load sufficiently to "get it on a paying basis." Nevertheless, the steamship line failed to earn a profit on operations and by early 1916 senior officers of Hill's railways were talking of selling the ships. On the other hand, if considered on the basis of total contribution, i.e., revenues to the railroads as well as the steamship company, the future was marginally brighter. And in 1917, business—both freight and passenger—turned up.[35]

34. *Official Guide of the Railways* (June 1916), p. 855; L. C. Gilman, 25 October 1915, to L. W. Hill; L. C. Gilman, 27 July 1915, to L. W. Hill; L. C. Gilman; 9 November 1915, to L. W. Hill. GN papers; GNPSSC, Traffic Report, 16 December 1915. Hill papers.

35. G. R. Martin, 28 April 1917, to L. W. Hill; L. C. Gilman, 9 January 1915, to L. W. Hill; L. C. Gilman, 10 February 1916, to Ralph Budd; L. C. Gilman, 6 November 1916, to H. A. Jackson; L. C. Gilman, 29 January 1916, to J. M. Hannaford and Ralph Budd; L. C. Gilman, 19 April 1917, to J. M. Hannaford and Ralph Budd; L. C. Gilman, 3 May 1917, to J. M. Hannaford and Ralph Budd. GN papers.

The year 1917, however, also brought the United States into World War I with the result that the federal shipping board in September requisitioned the two ships, paying $4.254 million, or about what they had cost. There was likely a great sigh of relief among most managers of the Hill Lines, since the likelihood of profitable operation for the steamship company was remote in the extreme. Thus passed James J. Hill's final foray into maritime commerce.[36]

Yet there was an important sequel to the story of the Great Northern Pacific Steamship Company. The *Great Northern* and the *Northern Pacific* performed splendidly as troop transports during and just after World War I. Indeed, the *Great Northern* was assigned to carry an important mail pouch to Pres. Woodrow Wilson who was returning home from Paris aboard the famous *George Washington*. That pouch was properly delivered, the *Great Northern* hastened on to Brest, France, to embark 3,000 troops, and then raced back across the Atlantic to beat the *George Washington*. To be sure, her great capacity for speed produced legends in the seafaring trade. But fate was not as kind to her sister ship; the *Northern Pacific* unfortunately burned and sank off the entrance to Delaware Bay in 1922. The *Great Northern*, however, was renamed *Columbia* and became flagship of the U.S. Atlantic fleet. In 1922 she was again renamed to become Pacific Steamship Company's *H. F. Alexander*, a luxury liner used in the coastal trade from Seattle to Los Angeles and for at least one special "Around America—New York to California" excursion. World War II found her again in transport service, now as the *General George S. Simonds*. She served in both theatres and was a principal at Normandy on D-Day. After this marvelous career she was cut up for scrap in 1948.[37]

* * * * *

Hill's motivation in expanding the influence of the railroads he controlled through maritime operations is clear enough. He wished to gather and control traffic for the longest possible haul by offering single-line service to and from points that were logically oriented to the service territory of the Hill Lines. His one-stop, supermarket approach to integrated transportation was simi-

36. John Carroll Carrothers, "'Hot Foot': The Story of a Ship," *U.S. Naval Institute Proceedings* (February 1956), pp. 171-79; *Official Guide of the Railways* (May 1926), p. 1365.

37. Pyle, II, pp. 62-63.

GREAT NORTHERN STEAMSHIP COMPANY

Between Seattle, Japan, China, Philippines

With Connections at Hong Kong for the Straits Settlements, Australia and all European and Asiatic Ports

The "MINNESOTA" was constructed in the United States to meet the special requirements of the Trans-Pacific passenger traffic from Seattle to Japan and China.

PASSENGER ACCOMMODATIONS UNEQUALED by any vessel in the Trans-Pacific trade and unsurpassed on the Atlantic.

All first cabin staterooms are outside rooms, located amidships. Unusually large and comfortable berths are provided. There are electric reading lights in each stateroom as well as telephone. State rooms are cooled and heated by natural means and by electric power.

Other features of the superb passenger accommodations are the music room, library, social hall, smoking room, children's play room and electric laundry.

The Minnesota is equipped with the most powerful wireless telegraph apparatus of any ship in the world. On a recent trip a new record in long distance wireless telegraphy was established when the Minnesota kept in communication with either Seattle or Yokohama at all times during the voyage.

The enormous dimensions of the Minnesota, combined with the bilge keels with which it is fitted, insure a steadiness and comfort at sea which is not obtainable on vessels of smaller tonnage, whilst its great beam provides spacious and comfortable decks for promenade and amusements at sea.

Honorable Horace N. Allen, formerly American Minister to Korea, speaks of his trip on the "Minnesota" as follows:

"I have made twelve trips across the Pacific on various lines, but for speed and comfort, the last, on the great 'Minnesota,' was by far the best and most enjoyable. I did not know that this trip could be made without a trace of seasickness until we made that passage with no more motion than we would experience at anchor in the harbor."

One way rates from Seattle are as follows:

	1st Cabin	2d Cabin	3d Cabin	Asiatic Steerage
Yokohama	$200.00	$100.00	$70.00	$51.00
Kobe	207.50	104.00	74.00	51.00
Nagasaki	222.50	110.00	80.00	51.00
Shanghai	225.00	115.00	85.00	51.00
Hong Kong	225.00	115.00	85.00	51.00
Manila	225.00	115.00	85.00	*51.00

Round trip rates from Seattle are as follows:

	First Cabin		Second Cabin
	4 mo.	12 mo.	4 mo.
Yokohama	$300.00	$350.00	$200.00
Kobe	312.50	365.00	208.00
Nagasaki	334.00	393.75	220.00
Shanghai	337.50	393.75	230.00
Hong Kong	337.50	393.75	230.00
Manila	337.50	393.75	230.00

*Chinese must not be booked to this port.

For detailed information, berth reservations, etc., inquire of any steamship representative or agent of the Great Northern Railway, or

H. A. NOBLE, Genl. Passenger Agent, St. Paul, Minn.

W. A. ROSS, Asst. Genl. Passr. Agent, Seattle, Wash.

Steamship "Minnesota."
(28,000 tons.)

SAILINGS WESTBOUND, 1912.
(Subject to Change Without Notice.)

SEATTLE	YOKOHAMA		KOBE		NAGASAKI		MANILA		HONG KONG
Leave	Arrive	Leave	Arrive	Leave	Arrive	Leave	Arrive	Leave	Arrive
June 18	July 2	July 5	July 6	July 9	July 11	July 12	July 16	July 18	July 20
Sept. 17	Oct. 1	Oct. 4	Oct. 5	Oct. 8	Oct. 10	Oct. 11	Oct. 15	Oct. 17	Oct. 19
Dec. 16	Dec. 31	Jan. 3 1913	Jan. 4	Jan. 7	Jan. 9	Jan. 10	Jan. 14	Jan. 16	Jan. 18

(Courtesy of Burlington Northern, Inc.)

lar to that of Collis P. Huntington in the late nineteenth century, Donald J. Russell in the 1950s and 1960s, and the contemporary strategy of the CSX Corporation. In the case of the Northern Steamship Company, Hill aspired to avoid intermediary hauls via Chicago by moving traffic through Duluth and Buffalo and thence over the Great Lakes. That strategy was thwarted, however, by faster and cheaper rail passenger service and by freight shippers who insisted on their own routings. Indeed, the experience of Hill in terms of freight carriage on the Great Lakes goes far in demolishing the myth that rail carriers of that era had the power over shippers usually ascribed to them. In the case of the Great Northern Steamship Company, the raison d'être was equally clear. As Hill said repeatedly: "Oriental trade to us is an incident to our other business." Moreover, he hoped to rally the nation's merchant marine to the eminence it had enjoyed during the era of the clipper ship by demonstrating the value of huge vessels (the *Minnesota* and the *Dakota*) in economy of scale. Here his calculations proved incorrect, partly because of the inflexibility and slow speed of his ships, and in part because of factors he could not control. Finally, the purpose of the Great Northern Pacific Steamship Company "was intended to be an extension of our system lines to San Francisco." Hill was long enamored of reaching California and tweaking the ego of the sprawling Southern Pacific; a steamship line was the easiest, quickest, and least expensive way of doing so. Yet, while the strategy was sound, the tactics were not. In terms of timing and execution, the last of Hill's maritime ventures was the poorest. It was uncharacteristic. Perhaps Albro Martin was correct in asserting that Hill "should have stuck exclusively to railroads."[38]

38. *St. Paul Pioneer Press*, 21 August 1902; L. C. Gilman, 20 March 1916, to Ralph Budd. GN papers; Albro Martin, *James J. Hill and the Opening of the Northwest* (New York: Oxford University Press, 1976), p. 600.

Don L. Hofsommer, who received his Ph.D. in history from Oklahoma State University, is now a visiting professor at the University of Montana. Hofsommer's latest book, The Southern Pacific, 1901-1985, *was published in 1986 by Texas A & M University Press. He has also written about a number of transportation topics, including the* Great Northern Railway.

Maritime Studies at Sea Semester

JAMES MILLINGER

KING Neptune's waters in the northwestern Atlantic are the subject of the college program Sea Semester. The Sea Education Association (S.E.A.) of Woods Hole, Massachusetts, offers a five-course, one-semester program to undergraduates interested in what happened and what is happening on the surface and in the depth of these waters.

Sea Semester has two unusual features: educationally it stresses theories during the first half of the semester ashore in Woods Hole and putting those theories to the test during the second half of the semester at sea on the research vessel *Westward;* institutionally it has as its seagoing "campus" a beautiful white 125-foot schooner on which its students sail parts of the northwestern Atlantic from Newfoundland to Venezuela during the second half of the semester.

Sea Semester has changed in content and direction during its fifteen-year history. Among the factors that have led to the success of this unique program are the vessel, the character of the early leadership, the college connection, the Woods Hole location, the educational program embodying the philosophy of theory and practice, and the attractiveness of the idea of going to sea on a large sailing vessel.

The founding fathers searched the ports of the world before they found Drayton Cochran's *Westward* for sale in Hawaii in 1971. She was a steel vessel built in Germany by Abeking and Rasmussen in 1961 along the lines of North Sea pilot boats. These sea-kindly vessels were designed to heave-to in often rough seas off the estuaries of English rivers in the North Sea to await incoming cargo vessels. *Yankee,* Capt. Irving Johnson's famous world-circling brigantine, had similar lines. Drayton Cochran had sailed *Westward* around the world and had found her to be a safe and rugged vessel. She seemed to fit the needs of the Sea Semester program. Now more than a quarter of a century old, *Westward's* original steel plates, bowsprit, and lower masts attest to her rugged construction. When S.E.A. began to plan for a second vessel (now being constructed in a Spanish shipyard) a number of different hull designs were drawn up and studied, but eventually the naval architects returned to a hull shape and rig very similar to *Westward's.*

The new vessel will be named the *Corwith Cramer.* Her namesake, a lifelong yachtsman and educator, was one of the founders of S.E.A. and its executive director for its first decade. The continuity of his leadership for the first ten years of the program and that of a board of yachtsmen (most of whom were members of the Cruising Club of America) who were astute businessmen, lawyers, and men of affairs, combined to make the first decade a successful one.

Two of Cramer's particular personal qualities were fiscal conservatism and imaginative leadership. A tight-fisted administrator, Cramer had no doubt in his mind that all—money, employees, and students—were there to support *Westward* and to keep her at sea. However, he was flexible enough that he was willing to try experiments and shift policies and programs as donors, teachers, clientele, and the times changed around *Westward.* His most quoted line was, "If you have to, you can do almost anything. That's, of course, what *Westward* teaches."

Sea Semester succeeded under Cramer's leadership only when he reoriented what had been a program in which sail training came first and marine science second to one in which there was an almost equal emphasis on sail training and marine science. This change was sponsored by Boston University.

Sea Semester began as an entire semester at sea on the *Westward* and was administered by the *Sailing* Education Association. It did not attract enough "apprentices" to make what was basically a sail-training and character-building program viable.

In 1973 a six-week shore component of three courses was initiated and taught on the Boston University campus by Boston University faculty. This had the impor-

R/V *Westward*.

tant support of Dr. George Fulton, then chairman of the biology department, and Dr. Warren Ilchman, then dean of the College of Liberal Arts and Sciences. This "book-learning" was followed by sea components on *Westward* of varying lengths, according to the means of the student. A single scientist taught a marine science laboratory course on board and the master of the *Westward* taught a laboratory course in nautical science. Students received a full semester of academic credit from Boston University upon successful completion of the combination of the shore and sea components.

The key to financial survival had been found: parents were willing to pay the equivalent of a college semester's tuition when their sons and daughters returned not only with tales of adventure on the high seas and signs of maturity, but also with a semester's credit.

Now more than 140 American colleges and universities grant a full semester of credit to their undergraduates who attend Sea Semester.

S.E.A. became the *Sea* Education Association, moved to Woods Hole in 1975, and established its own shore component taught by its own faculty in rented facilities. Woods Hole was an ideal base for Sea Semester. It had an excellent scientific library and other research- and sea-oriented attractions: the Woods Hole Oceanographic Institution, the National Marine Fisheries Service (both with active research vessels), the

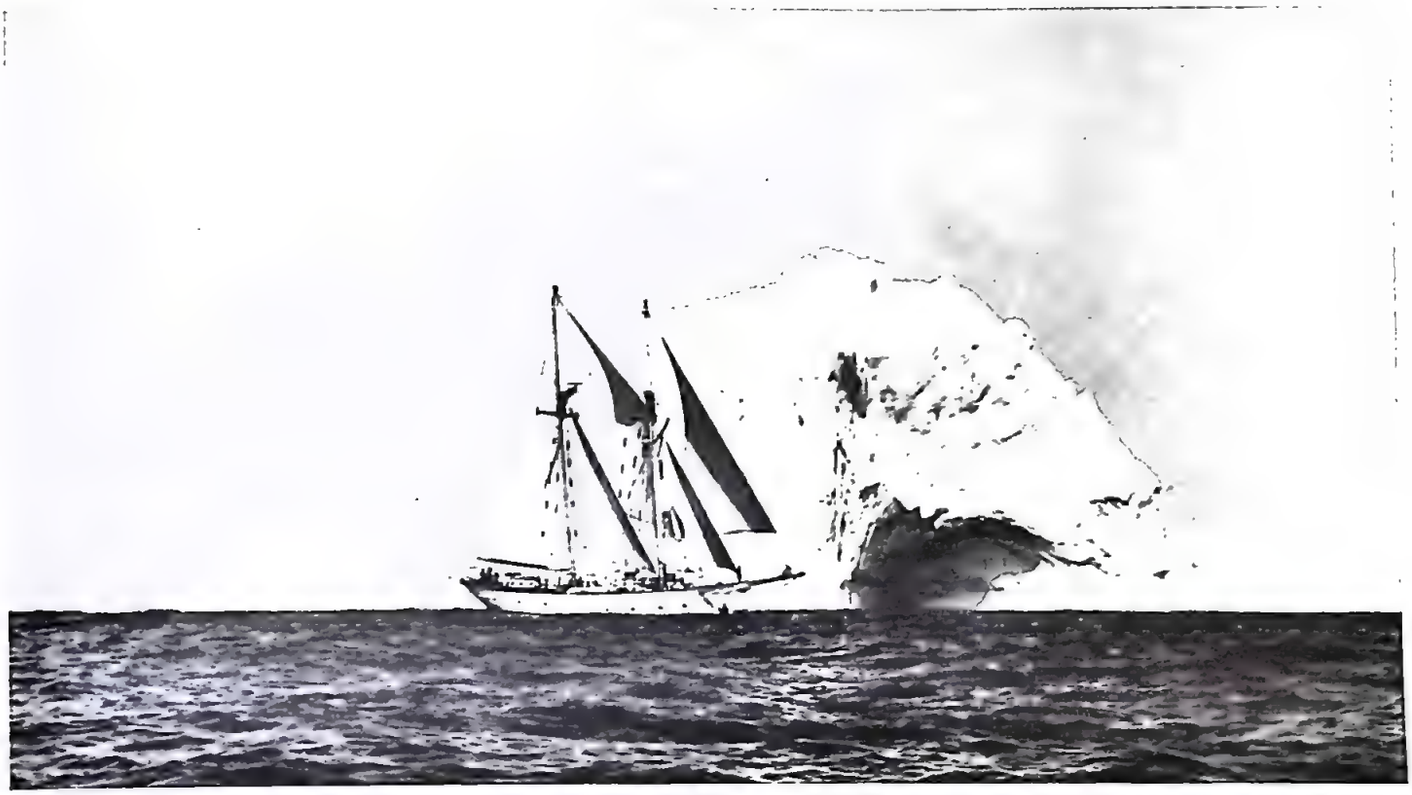
Village of Woods Hole, Massachusetts, summer 1982. (Photograph by James Staples, courtesy of the Woods Hole Oceanographic Institution.)

Marine Biological Laboratory, the U.S. Geological Survey, the local fishing fleet, the ferry boat fleet to Martha's Vineyard and Nantucket, and the vessels of the U.S. Coast Guard, not to mention the long-season yachting activities in Buzzard's Bay, and Martha's Vineyard and Nantucket sounds.

The move strengthened the organization and gave support to the new equal focus on marine science. By taking up facilities in one of the leading centers of marine science research in the world, Sea Semester became identified by many as a marine science program. Many local world-renowned marine scientists became attracted to the program and came to lecture in the small classroom in the marine science course; others went to sea on *Westward* as visiting investigators; and now eight sit on S.E.A.'s governing corporation.

This scientific input began to have its impact on fiscal policy. Gradually the marine science faculty was strengthened and more adequate scientific gear was purchased. In further efforts to strengthen the program, salaries were raised to attract a more permanent faculty. One of the problems in the first decade had been the rapid turnover of underpaid and sometimes underappreciated personnel. Now, as S.E.A. has moved into a $700,000 facility located on 4.7 acres overlooking both Nantucket Sound and Buzzard's Bay, Sea Semester has seven full-time faculty in oceanography, nautical science, and maritime studies, and sends *Westward* to sea

S.E.A.'s new $700,000 home in Woods Hole.



In Labrador waters, Canadian and American scientists perform bio-acoustical research aboard R/V *Westward.*

with four scientists who lead the students in maintaining a twenty-four-hour science watch.

The educational philosophy behind Sea Semester has been implemented in the balanced combination of theory ashore and practice at sea. The investigation of the theories and problems of oceanography (Oceanography, three credits), of navigating and moving a 250-ton displacement vessel from scientific station to scientific station by sail (Nautical Science, three credits), and of America's use of the sea (Maritime Studies, three credits), takes place in a traditional classroom setting.

The testing of that book-learning in carrying out scientific research projects and in navigating *Westward* (Practical Oceanography I and II, eight credits) and the testing of the self and the group in learning and living at sea, takes place under whatever conditions the weather brings during the six-week sea component. Nothing is contrived.

The highlight of the seagoing experience is the Junior Watch Officer Program. Twenty-four students board *Westward* as eager, yet sometimes awed novices, in oceanographic research and in the operation of such a large sailing vessel as *Westward.* Under the constant leadership and guidance of the assistant scientists and the mates, students learn the responsibilities of the science and deck watches. During the last two weeks of the six-week sea component each student has at least three watches as junior watch officer during which each is responsible directly to the chief scientist and the master of the vessel for the safe, proper, and successful operation of the scientific research on *Westward.* It provides them with the ultimate opportunity and challenge: to lead their classmates in combining the theories from the classroom and the practice of four weeks of twenty-four-hour science and deck operations to a successful watch.

Living and working at sea has held a fascination for humans for centuries, although the goal has usually been to get from one port to the next. Sea Semester offers the opportunity to go to sea to do more than merely make a successful passage. There is a purpose beyond mere transit—to discover and learn about the medium through which one is traveling and to contribute to the knowledge of the oceans. While this is going on, the students are also undergoing personal tests as their small community attempts to survive the ordeal of living and working at sea for six weeks.

Maritime studies is taught as one facet of Sea Semester's multidisciplinary approach to the seas.

America's maritime heritage is introduced against a background of seafaring in the North Atlantic and the world's oceans. General lectures on early maritime exploration, the search for trade, fish and oil (from whales) set the stage for later discussions of these topics in contemporary times. These are complemented with discussions of literature written by either participants or observers of these occupations. Vessels and the rigs that evolved to propel them in response to sailing the winds are introduced. The shift from sail to steam and the history of travel at sea in the age of iron (and later steel) and coal-fired (and later oil- and nuclear-fired) vessels introduces the contemporary problems of the merchant marine. Shipowning, shipbuilding, and ship operating are discussed against a background of labor unions and government subsidy and control. This entails lectures on the role of the contemporary American merchant marine, the U.S. Navy, and the contemporary problems in fishing and obtaining oil (now from the sediments rather than from whales). This is followed by a discussion of the Law of the Sea as it pertains to our use of the sea and the Exclusive Economic Zone. As in the discussion of America's maritime heritage, literature in the form of novels, plays, and short stories is used as examples of seagoing today. Special lectures and demonstrations on seafaring as witnessed in the songs of seamen and the art and artifacts produced by them and by shorebound observers of the maritime scene are introduced as well.

The course concludes with discussions of the salient questions of the day in maritime policy.

Jim Millinger, who received his Ph.D. in history from Yale University, has taught at Lehman College, Wesleyan University, and the University of Redlands. He served as dean of Sea Semester for the Sea Education Association (S.E.A.) of Woods Hole, Massachusetts for seven years, where he now teaches maritime studies and goes to sea on Westward *as a teaching mate. He has crewed on the schooners* Alice S. Wentworth *and* Mattie, *captained the* Sabino *and other Casco Bay Lines' vessels, and served as an officer in the U.S. Navy.*

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Book Reviews

CAPT. WILLIAM CHAMBERS, RN, *Atlas of Lake Champlain, 1779-1780* (Bennington and Montpelier: Vermont Heritage Press and Vermont Historical Society, 1984). 12⅜" x 15¾", cloth, xxxi + 71 pages, 50 illustrations, 32 color charts, glossary, index, and introductory essay by J. Kevin Graffagnino. $49.50.

In publishing this handsome facsimile edition of Capt. William Chambers's little known *Atlas of Lake Champlain*, the Vermont Historical Society has made available to students of the history of cartography, scholars of the American revolutionary era, and passionate admirers of the Champlain Valley an exceptionally attractive companion for their further study of that historic region. Reproduced from an *Atlas* manuscript acquired by the society in 1928 (the only other complete copy being found in British Ministry of Defense archives), this welcomed publication reveals Chambers's work as the first compilation of detailed marine charts and related sailing directions undertaken for Lake Champlain. Its publication impressively documents an ambitious wartime hydrographic venture that was designed to provide British naval officers with precise navigational data not available in contemporary military maps of the region, several of which are reproduced from the Wilbur Collection of Vermontiana in the University of Vermont Library for comparison purposes.

Burgoyne's defeat and surrender at Saratoga in October 1777 by no means opened the Champlain corridor for a second northward drive by American forces against Montreal and the St. Lawrence Valley. The British fleet that had, under Capt. Thomas Pringle, RN, destroyed Benedict Arnold's weaker surface forces at Valcour Island and Buttonmould Bay in October 1776, as well as convoyed Burgoyne's army on its southward advance during the following summer, succeeded in maintaining firm command of Champlain's strategic waters for the remainder of the conflict, nowithstanding the army's debacle at Saratoga. Under the command of Lt. William Chambers, various elements of the British naval force of ships, schooners, sloops, and gunboats continued active operations based on St. John, supporting a succession of Loyalist raids on American outposts in northern New York and Vermont that effectively masked the defensive position of British forces in the St. Lawrence Valley. Those obscure forays, as succinctly characterized by J. Kevin Graffagnino in his well-illustrated introduction to the *Atlas*, created "a no-man's land to a distance of 200 miles across which the British could readily detect the approach of any sizeable enemy force." During their patrols and logistical sorties as far south as Crown Point during 1778-1780, Chambers's vessels routinely required secure anchorages and frequently encountered uncharted navigational hazards, leading this thirty-year-old British seaman to undertake the first nautical atlas of Lake Champlain.

British military engineers had earlier published a succession of increasingly detailed maps of the Champlain Valley, perhaps most notably the handsome draught of William Brassier, whose cartographic activities in that theater during the Seven Years' War are embodied in his masterful "A Survey of Lake Champlain, including Lake George, Crown Point and St. John," which was completed in 1762 and published at London in 1776, together with Jackson's 1756 survey of Lake George. Reproduced for army field use in Sayer and Bennett's *American Military Pocket Atlas* (1776), the Brassier survey noted that "The Soundings of the Lake are very deep in general; in many Places 60, 70 and 80 and in some parts 100 Fathoms," but it proved inadequate, lacking precise soundings and sailing directions, for the wide-ranging operations of Chambers's ships.

William Chambers was notably junior in rank when selected by Gov. Sir William Haldimand to command British naval forces in the obscure northern theater, but he brought solid professional credentials to that assignment. A native of Warwickshire, he had entered the Royal Navy as a midshipman at the age of ten, winning the marked attention of an early protagonist of hydrographic training, Capt. Hugh Palliser, under whom he

served during the siege of Quebec in 1759. Chambers gained further amphibious experience during the abortive British assault on Charleston in 1776, being subsequently ordered to Canada, where he arrived late in 1777, in the wake of Burgoyne's disaster. Initially Chambers looked for cartographic assistance from the Royal Engineers, in particular Lt. Henry Rudyerd, a talented artist whose drawings of Fort St. John and Ticonderoga are reproduced in the present volume from the Public Archives in Ottawa. Rudyerd's progress in producing a serviceable marine survey of Lake Champlain appeared unpromising as the spring of 1779 approached, and Graffagnino concludes from his researches that "there is no indication that Chambers ever received a finished copy of the long awaited Rudyerd Map." One clue suggests that the point merits further investigation. In any event, the British naval commander took charge of the task himself in May 1779, utilizing the reliable schooner *Maria* to carry out wide-ranging surveys during ensuing summers that produced a handsome portfolio of no fewer than thirty-one detailed charts and accompanying sailing instructions, together with a composite "Plan of Lake Champlain from Fort St. John to Ticonderoga, including Part of Lake George." Prepared by Chambers's able draftsman, Gustavus Augustus McGusty, this summary plan includes data on "Rocks, Shoals, Sands and Soundings" discovered in the surveys of 1779 and 1780, incorporating seven insert charts, one of which (the Isle aux Noix) is credited to the 1779 survey of Maj. Christopher Carleton.

That Chambers's *Atlas* benefited from the earlier work of British military engineers, particularly in the delineation of Champlain's shoreline and islands, is readily apparent when the composite plan is compared with Brassier's 1762 survey, a work that surprisingly graces the dust jacket of this society publication. The question of Chambers's wartime collaboration with army colleagues, suggested by the acknowledgment to Carleton, remains intriguing, particularly when considered in connection with other surviving draughts of these post-Saratoga surveys. Clues possibly lie in the Public Archives at Ottawa, as well as the Chambers manuscripts, including his fieldbook and rough notes that are found with the only other known eighteenth-century manuscript of his *Atlas*, preserved in the collections of the hydrographer of the Royal Navy at Taunton, Somerset. The William Faden Collection, acquired by the Library of Congress in 1864, contains another significant element, an unsigned manuscript, elaborately rendered in pen and ink and watercolor, entitled "Plan Lake Champlain from Fort St. Johns to Ticonderoga, with the soundings, rocks, shoals and sands, surveyed in the years 1778-1779," that appears to be another, possibly earlier draught for the Chambers composite plan. Prepared, as the two known Chambers plans, to the scale of one inch to the mile, Faden MSS 64 depicts the Champlain region from Fort St. John to the waters just south of Crown Point, while closely conforming to the orientation, graphic detail, and annotations found in those completed renderings. Including the same lines of numerical soundings, rocks, and shoal indications found in the Chambers manuscripts, Faden MSS 64 also contains additional elements suggesting a military involvement in the surveys. Individual fortifications are outlined at Fort St. John, Isle aux Noix, Point au Fer, and Crown Point; military mapping conventions are evident in the depiction of bluffs and forested shorelines, features replaced in the Chambers manuscript by lettered descriptions. Unlike the Chambers work reproduced in the Society publication, this anonymous plan also includes pen sketches of the individual British and American vessels engaged at Valcour Island, as well as sketches of the British ships present at the destruction of Arnold's remnants at Buttonmould Bay. In these depictions, both Pringle's and Arnold's gunboats bear cannon mounted on large-wheeled artillery carriages, rather than eighteenth-century truck or slide carriages such as survive on the Continental Gondola *Philadelphia,* that exceptional time-capsule from the bottom of Valcour Bay. Most intriguing in Faden MSS 64, however, is the bald indication that the survey it represents had indeed been initiated in 1778, raising again the spectre of Henry Rudyerd or some other early military collaborator.

Cruising and often anchored off forested shores that on occasion harbored hostile American scouting parties, Chambers was sometimes handicapped (and could have utilized army support) in conducting his survey and sounding operations; yet his charts (including Faden MSS 64) bear annotations that much of the painstaking work was completed in the summer of 1779, including the historic waters off Valcour Island and Buttonmould Bay. As Graffagnino appropriately emphasizes, Chambers's hydrographic effort on Lake Champlain stands in the tradition of Cook (who developed

under the Palliser influence), Vancouver, and Bligh, providing a reliable mariner's guide to waters yet again cruised by British seamen during the War of 1812. For the archaeologist, Chambers's works, including Faden MSS 64, will continue to provide strong incentive for fruitful exploration in Champlain country. For historians, the dispersion of the Chambers collection offers yet another cautionary insight into nineteenth-century archival management.

PHILIP K. LUNDEBERG

Smithsonian Institution

DAVID WALKER, *Champion of Sail: R. W. Leyland and his Shipping Line* (London: Conway Maritime Press, 1986) 11″ x 8″, cloth, 192 pages, 150 photographs, appendices, index. £15.00.

Those commercial deep-sea sailing vessels that stand closest to us in time and that are still within the living memory of man are the great fleets of iron and steel square-riggers that were built by the Western European maritime nations in the closing decades of the nineteenth century and tramped the oceans of the world hauling bulk cargoes of timber, coal, grain, and guano. Unlike their ancestors, the wooden downeasters and iron tea clippers, these behemoths of the last days of sail were designed and built at a time when efficient steam-powered freighters were already a reality and could compete effectively in all but the most prosaic of ocean trades.

To beat the steamers the owners and managers of deepwater sailing ships relied on relatively low capital investment, nonexistent fuel bills, painfully small crews, tiny outlays for provisions and supplies, brass-bound apprentices whose labor was exchanged for nautical instruction, and an afterguard pared to the bare minimum needed to supervise crews standing exhausting four-on-four-off watches. The ships themselves were large and awkward to handle. Steel masts and spars and wire rigging made enormous sail plans possible with massive gear aloft and yards so big in diameter that it was hard to bend over them to furl the canvas. Voyages lasted for months during which all hands did without fresh food, electric lighting, hot water, and communication with the outside world. On the average each square-rigger lost one man a year either washed overboard or in falls from aloft, and there was a steady toll of smashed gear and stove-in deckhouses inflicted by the massive seas encountered off Cape Horn.

It was a way of seafaring life scarcely imaginable today but David Walker has recaptured it handsomely in his book on the Leyland Shipping Company of Liverpool. The Leyland Line was a family enterprise which began as a marine insurance business and gradually expanded into shipowning and operation. Their first vessels were second-hand wooden ships but soon they were building their own distinctive fleet of steel three-masters which, at tonnages in excess of two thousand and lengths of 305 feet on deck, tested the limits of the traditional ship rig. The *Wavertree*, now docked at South Street Seaport in New York, is a surviving example of Leyland design philosophy. It provided the author, who is a descendent of the family, with the inspiration to undertake this work after he had discovered several volumes of private papers related to her and her sisters.

The result is a volume that combines a business history of the Leyland firm, a family narrative detailing the life and times of the Leyland Brothers as successful shipping magnates complete with baronial mansions and tall silk hats suitable for attending serious business conferences at the Liverpool Exchange, and a technical discussion of the ships that wore the Leyland house flag. The company and its owners were steeped in tradition which was reflected in everything they did. Their favorite sailing ships were named for suburbs of Liverpool and their officers were promoted from the ranks of company stalwarts. At least one Leyland heir was sent to sea at the age of eleven to serve an apprenticeship before the mast. Collisions, groundings, lawsuits, and assorted other casualties took their toll but on balance the company remained profitable until a prolonged shipping depression and severe competition by even more frugal Scandinavian owners dimmed the prospects of British merchant sail. Thereafter, declining fortunes and ill health had made heavy inroads on the company's leadership from which it never recovered. The First World War sounded the death-knell for many of the Leyland square-riggers which had by then passed to foreign flags while others survived to be cut down to barges. It was in this condition that *Wavertree*, one of the last of the breed, was found and brought to South Street.

JAMES E. VALLE

Delaware State College

WILLIAM S. DUDLEY, ed., *The Naval War of 1812: A Documentary History*, vol. I (Washington, D.C.: Government Printing Office, 1985). liv + 714 pages, index.

With the publication of this volume William S. Dudley joins the distinguished company of Dudley Knox and William James Morgan as an accomplished editor of naval documents. To some degree his task was a bit more difficult than his predecessors for his resources are considerably smaller. For the Quasi-War and the Barbary Wars Knox had seven and six volumes respectively. Morgan's documents on the Revolution are currently at eight volumes and still counting. Dudley was told to keep his series to three volumes.

Despite the restrictions he has accomplished a good deal. He has waded through thousands of documents to find those few that best tell the story. We must accept on faith that his selections are fair minded and illustrative—there is nothing in this volume to suggest otherwise. In this difficult task of picking and choosing, Dudley and company have stepped beyond the broadside-to-broadside approach and present us with a full array of documents reflecting the human drama of war at sea. In this regard the Petition of Jane Stinger is a poignant reminder of a wife's separation from her husband (p. 260) as is the plea of a widow wanting to know more about her deceased husband (p. 506).

With their more comprehensive efforts Knox and Morgan were content to allow the documents to speak for themselves; neither editor placed much in the way of explanatory matter within the text. To the contrary, Dudley devotes a large portion (perhaps as much as 25 percent) to explanatory matter. To some degree this reflects a policy decision on the part of the Navy Department. The title of this volume is revealing in this regard. It is *A Documentary History*. Neither Knox nor Morgan referred to their work as "History." Given Dudley's extensive narrative between documents, the use of the term "History" and the very attractive dust jacket, it would appear that this volume is directed in part at a trade market, that is, a much wider audience than the scholarly one with which Knox and Morgan were (and are) concerned. This strategy may or may not work—only the sales reports will tell.

For scholars who are concerned that more documents are not presented, Dudley argues that by following source citations they can easily delve deeper and consult the original materials or in many cases microfilm copies. Without question, Dudley means what he says and anyone who has ever worked at the Naval Historical Center or sought its assistance can testify to the superb cooperation that is always forthcoming from that quarter. Unfortunately, in downtown Washington the story is not quite the same. Recently, this reviewer requested the interlibrary loan office at his institution to request certain microfilms in RG 45 from the National Archives. The response was negative. They were unable to comply because budgetary cuts had reduced their staff. Dudley's hope that his volume will encourage further research is thereby compromised.

In future volumes Dudley might wish to consider the inclusion of modern maps. Contemporary maps are interesting but as devices for discerning geography they often come up short.

No review of this volume should fail to mention the fifty-nine-page index which ought to stand as a model for projects of this kind. Thanks to Dudley we now know more about the War of 1812, its origins and first year. National Archives notwithstanding, it seems certain his efforts will indeed spark new interest in this old conflict. Without question we should all look forward to future volumes.

WILLIAM FOWLER

Boston, Massachusetts

PAOLA E. COLETTA, comp., *An Annotated Bibliography of U.S. Marine Corps History* (Lanham, Md.: University Press of America, Inc., 1986). 5½" x 8¾", library binding, 432 pages, author and subject indexes. $37.50.

The United States Marine Corps has long enjoyed a record of not hiding its light under a bushel. The late Gen. Douglas MacArthur was of the opinion that the Marine Brigade in France, 1917-1919 (then part of the U.S. 2nd Army Division, AEF), had received more than its just share of publicity for its feats in combat to the degree he did not entirely change his mind until the amphibious landing at Inchon, Korea, in September 1950, expertly accomplished by the 1st Marine Division. Similarly, the late Pres. Harry Truman (one-time captain of field artillery in the AEF) in an unguarded moment in August 1950 voiced his opinion that the Marine Corps had "a propaganda machine that is almost

equal to Stalin's," an observation that within ten days practically forced him into writing a letter of apology to the then-commandant of the Marine Corps. So, when a professor emeritus of history, U.S. Naval Academy, takes time out to write a scholarly (and complimentary) historical work pertaining to the Marine Corps, it is pleasant to relate that in this instance a respected member of the sister service is blowing the Marine Corps' bugle, loud and clear, with no axe to grind.

As Professor Coletta states in his explanatory notes, having previously written a companion *Bibliography of American Naval History*, one of his major problems in works of this sort is the determination of what should be included and what disregarded; in this case, he had to select some four thousand titles from the six thousand amassed. Another complication, largely a matter of value judgment, relates to the selection of titles applying to two or even more chapters. Herein, there are overlappings of topics involving chronology and geography, roles and missions, techniques and developmental changes, to name but a few, all of which eventually had to be cross-referenced and cross-indexed, hopefully without prejudice but with appropriate consideration. To sort all this out was no mean feat. Professor Coletta solved the impasse by arbitrarily assigning titles in each chapter in the following order: six principal headings—books, documents, dissertations and theses, periodical articles, fiction, and motion pictures. Included are meticulous listings of library call numbers for books, giving both Marine Corps Historical Center Library and Library of Congress call numbers (which do not necessarily agree in some cases), all of which in any event were designed to assist the researcher by cutting down on the time otherwise required to thumb through endless card catalogues. Before jumping into the meat of the matter—selected biographical aids and reference works (arranged alphabetically by author)—the compiler supplied much useful information by discussing Marine Corps histories, formal as well as popular accounts, pertinent periodicals published by the Marine Corps as well as current post and station papers, and naval science as defined by Library of Congress classifications with reference to the special category VE-Marines. Thereafter, procedure follows the usual general to the specific, important sections being those devoted to personal papers held at the History and Museums Division, USMC Headquarters, and transcripts of oral interviews, current as of November 1984.

Just to browse through, let alone carefully scan, this masterful compilation is not something accomplished by casual summer reading. A tremendous amount of time and labor went into Professor Coletta's finished product, and in the opinion of this reviewer a substantial number of inquiries, usually referred to the Historical Division's Reference Section (by telephone or by letter), can be resolved by professional or amateur inquirer availing himself of the information so comprehensively and selectively arranged (and annotated) within its covers. For example, you can find out how "Bigfoot" Brown and "Howlin Mad" Smith won their nicknames; you can discover the life and times of such well-known and admired marine officer characters as "Old Gimlet Eye" (Butler), "Hiking Hiram" (Bearss), and "John the Hard" (Hughes) not to mention "Sunny Jim" (Vandegrift), "Jiggs" (Geiger), "Chesty" (Puller), and "Pappy" (Boyington); and the entire history of Marine Corps Aviation, for instance, from stick-and-string to the latest jet interceptor machines, can all be readily documented. Employing the highly sophisticated computerized filing system, installed by the Historical Division, and its almost uncanny ability to supply instant retrieval data, future Marine Corps historians are going to have their labors materially eased and accelerated if they will combine all the sources of information currently within reach, Professor Coletta's opus being a vital component.

Errors and omissions: remarkably few have been encountered, particularly significant in a text of this nature primarily because of its very complexity, but a few have crept in, notwithstanding. On page 14, having gone through all the trouble of listing military titles in order for the various armed services, the compiler apparently omitted the ranks of lieutenant (JG) junior grade and major, as well as the ratings of sergeant major and platoon sergeant. On page 71, under the category of personal papers, a Puller, C. is shown. Puller, Lewis B. would be more in order; likewise, the entry is misleading in that only a partial collection of General Puller's personal correspondence is deposited at USMC Headquarters, by no means all of it, a fact the reviewer ascertained by contacting the director of the History and Museums Division. Entry 1976 on page 134, John W. Thomas, Jr., USMC, should read John W. Thomason, Jr., USMC.

Having had extended foreign service in parts of South America, the Caribbean and West Indies, and Haiti and the Dominican Republic in particular, this reviewer devoted careful attention to entries concerning that geographic area, specifically expeditionary and police duties 1901-1934. He noted the omission of: Hans Schmidt, *The United States Occupation of Haiti,* 1915-1934 (New Brunswick, 1971), which might have been included. Likewise, under the caption "A Force in Readiness 1953-1983, Dominican Republic, 1965," Gen. Rathvon Tompkins, *Ubique* (Marine Corps Gazette, September 1965), a detailed article on Marine Corps operations ashore at that site, might well have been listed. Under subject index, Geiger 2389 should read 2392, and Geiger 2419 should properly read 2418. By the same token Thomason 3844 should be shown 3843, admittedly insignificant errors, but of some interest to the reviewer, having written biographies of both the late General Geiger and the later Colonel Thomason.

All in all the volume is very well done, and should prove a welcome boon to serious writers and historians. The accompanying remarks and evaluations organized and presented are particularly useful.

COL. ROGER WILLOCK, USMC (RET.)

Portland, Maine

NORMAN J. BROUWER, *International Register of Historic Ships* (Annapolis, Md.: Naval Institute Press, 1986). 8½" x 17", cloth, lx + 320 pages, 400 black and white illustrations, appendix, index. $28.95.

The maritime world has long needed a volume that lists information concerning ships of particular significance that are currently being preserved in maritime museums and in other ways all over the world. It is thus with particular pleasure that one notes this magnificent volume of Norman J. Brouwer who is curator of ships at South Street Seaport Museum of New York City which does just this. This international register of historic ships lists and illustrates some 706 vessels and smaller craft down to an over-all length of forty feet which are still to be found in some forty-three countries around the world.

They have been listed under four classifications: naval, merchant sail, merchant steam, and miscellaneous. Some few of them have been dealt with more extensively with multiple illustrations and a brief history of their maritime careers. They include such important ancient vessels as the royal barge of Cheops, as well as the Viking Gokstad and Osberg ships, Nelson's *Victory* and USS *Constitution,* and a number of more modern famous examples of the shipbuilders' art. No one interested in the sea on a scholarly or popular level should be without this volume. We are all in debt to the author for providing us with what will be the standard work on the subject for years to come.

ARCHIBALD R. LEWIS

Salem, Massachusetts

HILMAR C. KRUEGER, *Navi e proprietà navale a Genova, seconda metà del sec. XII* [*Atti della Società Ligure di Storia Patria,* N.S. vol. XXV (XCIX), fasc. I] (Genova, 1985). 206 pages.

It is the declared aim of this work "to illuminate, from a general point of view, the political and socio-economic position of Genoese shipowners of the twelfth century." The survival of the mid-twelfth-century notarial chartulary of Giovanni Scriba, the earliest of its kind, and of several other Genoese notaries from the next few decades, makes the last half of the twelfth century about the earliest period for which one can begin to develop any kind of reliable conception of group activities from the records regarding individuals of the Genoese business classes. Professor Krueger's study of shipowners is an admirable exploration of the activities of one such group.

The book is organized on a chronological basis into two parallel sections, the first section dealing with the period from 1155 to 1164 and the second from 1165 to 1200. This unequal division into one period of nine years and another of thirty-five years may appear unbalanced at first, but it is only a logical reflection of the sources. For the first decade Giovanni Scriba's chartulary is virtually the only source of information on ships in relation to their owners and thus presents a nearly self-contained body of evidence. In the second period, though there are public sources that yield information regarding ships and their owners in the ser-

vice of the Genoese state between 1164 and 1179, there are almost no sources regarding private activities. Thus a kind of natural break in the available information is created. After 1179, documents from a variety of sources attest to the activities of over three hundred shipowners. In all, Krueger investigates the activities of more than four hundred Genoese shipowners of the late twelfth century.

Each section begins with a list of the transactions of, or references to, each of the shipowners and ships year by year. The sections closely parallel one another so that for each period Krueger takes up the questions of continuity of ownership, the mercantile activities of the owners, their investments and noncommercial incomes, and, finally, their political and governmental activities. The ships themselves are not ignored. In the first part the author describes the two most generally encountered types, the *navis* and the *galea* as well as less common types such as the *bucius,* the *barca* and several others, and investigates the ways in which they were used. In the second part a discussion of the numbers, value, and capacity of various ship types occupies the section devoted to the ships.

The most valuable contribution of this book to our knowledge of medieval Genoese merchants is to place the shipowner firmly in a wide context of activities. Krueger goes well beyond a study of ships and shipping enterprises to pursue references to many other affairs of those persons whom he has established as shipowners. In this way their other mercantile and political endeavors emerge as well as those that are strictly maritime. Still, Krueger is always properly conservative in his generalizations. We are frequently reminded that the surviving documents represent only a small part of the total business activity of the era. The book's first sentence cautions the reader that Giovanni Scriba was "only one of at least ten notaries at work in that period."

Nevertheless, the author presents a persuasive picture of the overall activities of these twelfth-century Genoese shipowners. We see them as lenders and investors in trade, most commonly as participants in commenda contracts. Their participation in these activities grew even greater toward the end of the century. Numbers of them also had substantial incomes from land, loans to the republic, and other nonmercantile sources. Krueger shows that most investors diversified their holdings considerably, not only between different types of investments but also over several ships. It was more common for businessmen to own shares in several ships than to own one entirely. And there were many little investors who owned only very small shares of ships which they turned over frequently. This tendency towards diversification and the participation of small investors in the maritime enterprise increased as the end of the century approached. A little over a quarter of the shipowners studied were active at the highest levels of Genoese politics, holding important offices, acting in diplomatic capacities and, of course, commanding fleets.

As is usual in Italian works of this kind there is an index of names of persons and places. Additionally there is an index of the names of ships. A topical index would, perhaps, have been more useful, but is not likely to be too much missed in this relatively brief work which is so carefully divided into topical sections.

The wealth of sources regarding the activities of private individuals has long made Genoa one of the richest fields for the study of medieval businessmen. Hilmar C. Krueger has spent a fruitful career in this field since his work in editing several of the twelfth-century notaries in the 1930s. His long and intimate familiarity with the Genoese notarial archives and other Genoese sources informs every page of this monographic study. The scholarly monograph that examines a single topic in great depth has almost become an endangered species in American publishing. *Navi e proprietà navale a Genova* shows that there is still much merit in this approach.

JOHN E. DOTSON

Carbondale, Illinois

WALLACE E. MARTIN, comp., *Sail & Steam on the Northern California Coast, 1850-1900* (San Francisco: National Maritime Museum Association in cooperation with the Golden Gate National Recreation Area, 1983). $10\frac{5}{8}$" x $8\frac{1}{4}$", cloth, xvi + 351 pages, 94 illustrations, 2 maps, index. $27.50.

Lumber from the redwood and fir forests of the coasts of Northern California, Oregon, and Washington was in seemingly endless demand for construction in the San Francisco Bay region and to the south as far as San Diego from the Gold Rush years onward. Along

the Northern California coastline there was only one really good harbor, Humboldt Bay, and the entrance here was narrow and dangerous. Since it was impossible to ship lumber by land routes, this bay and the river mouths and inlets or "dog holes" were the only places where timber could be exported. At first lumber was loaded in sailing vessels, mainly schooners, and from the 1880s onward increasingly in steamers which were generally dubbed "lumber schooners." For this frequently perilous trade, shipbuilders were challenged to turn out sturdy vessels, and the men who sailed them developed skill of a high order.

This book is a collection of hundreds of excerpts from newspapers that relate principally to the maritime lumber trade. Obviously they deal mainly with "newsworthy" events such as launchings, first arrivals of vessels, wrecks, and rescues, but there are some that cover developments in general in the coastwise lumber business, port conditions, and local water transportation. They are mostly drawn from Humboldt Bay newspapers, but some are from the San Francisco press and others from as far north as Puget Sound. If read carefully and as a whole they provide an excellent picture of shipbuilding and the coastal trade of Northern California in the last half of the nineteenth century. Individually, of course, they provide a wealth of information on specific events, men, and ships.

Apparently almost all of the articles are quoted verbatim and complete, but there is internal evidence that a few have been edited due to their length. The code identifying newspapers quoted is rather obscurely located in the appendix, which also contains a list of vessels built on Humboldt Bay down to 1880, lists of shipbuilders, shipmasters, shipwrecks, and drawings of sailing ship types. There are indexes of personal and corporate names, place names, vessel names, and records.

The compiler of this remarkable book is Wallace E. Martin, a lifelong resident of the Humboldt Bay region. His experience includes newspaper writing, seafaring, shoreside ship management, and historical research and writing. The introduction by Karl Kortum, chief curator of the National Maritime Museum, San Francisco, places the collection of quoted articles in its setting, and describes the events that led to its eventual publication. The book is splendidly illustrated by photographs, reproductions of paintings and engravings, and maps. The illustrations are organized into four sections: wharf activity, inside and outside ports, shipbuilding, and marine disasters. Each of these is prefaced by a text written by David Hull, principal librarian, National Maritime Museum. The captions of the individual pictures reflect the expertise of Hull and Kortum as well as of Mr. Martin.

The researcher in the field of Pacific Coast maritime history as well as the general reader with interest in that field will have reason to be grateful to Mr. Martin and the others who prepared and saw to the publication of this remarkable collection. It will serve as a valuable guide to further investigation in the field and a rich source of information regarding an important region and trade.

JOHN HASKELL KEMBLE

Pomona College

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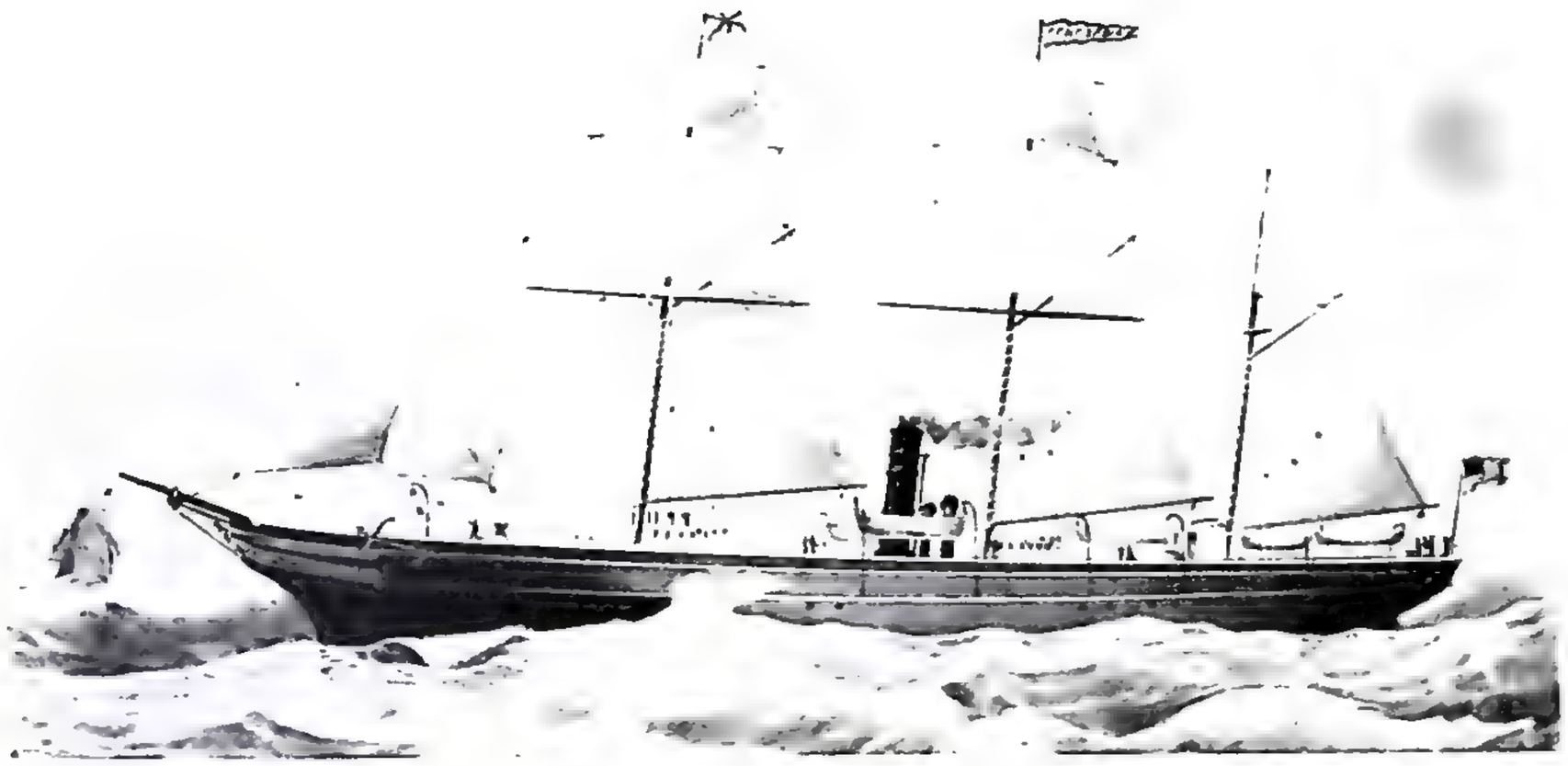

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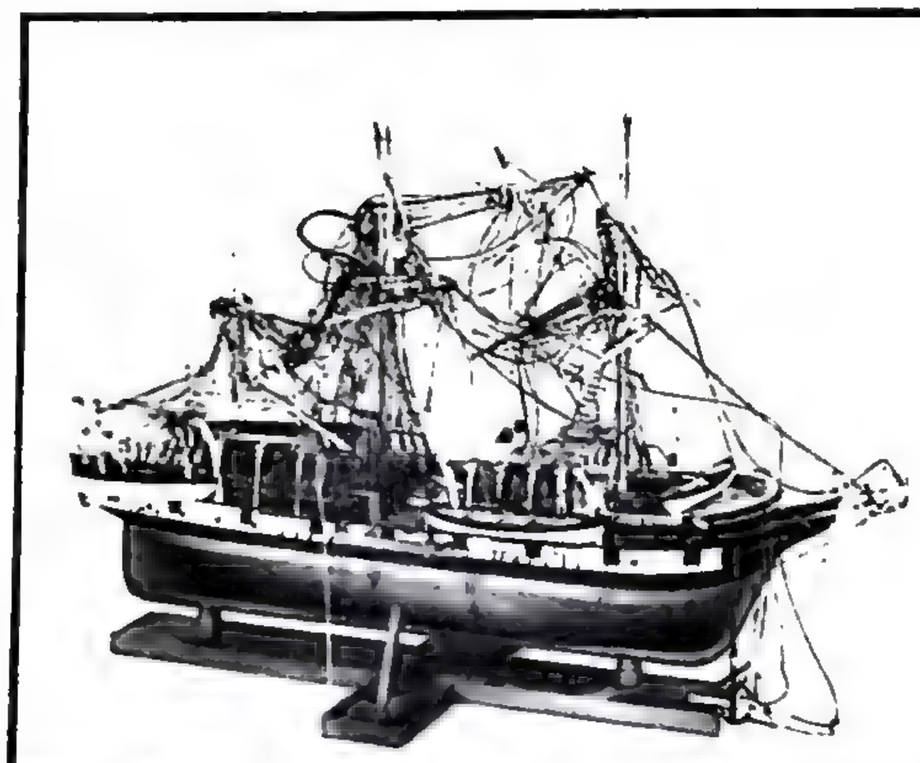

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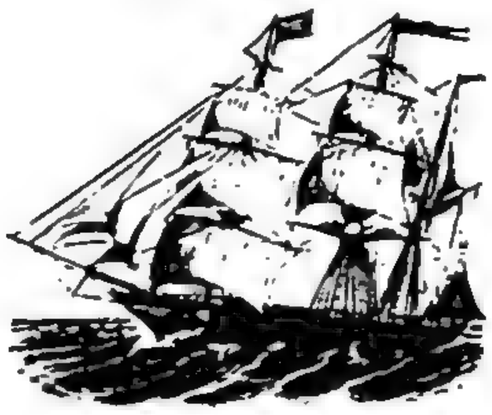

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